



NASA SP-7039 (06)

Section 1

Abstracts

NASA

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# PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY

Section 1 • Abstracts

JANUARY 1975

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

JANUARY 1975

## ACCESSION NUMBER RANGES

<i>Bibliography Number</i>	<i>STAR Accession Numbers</i>
NASA SP-7039(04)	N69-20701—N73-33931
NASA SP-7039(05)	N74-10001—N74-21629
NASA SP-7039(06)	N74-21630 — N74-35363

This bibliography was prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by Informatics Information Systems Company.

**NASA**

**PATENT  
ABSTRACTS  
BIBLIOGRAPHY**

**A CONTINUING BIBLIOGRAPHY**

**Section 1 • Abstracts**

Annotated references to NASA-owned inventions covered by U.S. patents and applications for patent that were announced in *Scientific and Technical Aerospace Reports (STAR)* between July 1974 and December 1974.



This Supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22151, for \$3.00. For copies mailed to addresses outside the United States, add \$2.50 per copy for handling and postage.

# INTRODUCTION

Several thousand inventions result each year from the aeronautical and space research supported by the National Aeronautics and Space Administration. The inventions having important use in government programs or significant commercial potential are usually patented by NASA. These inventions cover practically all fields of technology and include many that have useful and valuable commercial application.

NASA inventions best serve the interests of the United States when their benefits are available to the public. In many instances, the granting of nonexclusive or exclusive licenses for the practice of these inventions may assist in the accomplishment of this objective. This bibliography is published as a service to companies, firms, and individuals seeking new, licensable products for the commercial market.

The *NASA Patent Abstracts Bibliography (NASA PAB)* is a semiannual NASA publication containing comprehensive abstracts and indexes of NASA-owned inventions covered by U.S. patents and applications for patent. The citations included in *NASA PAB* were originally published in NASA's *Scientific and Technical Aerospace Reports (STAR)* and cover *STAR* announcements made since May 1969.

For the convenience of the user, each issue of *NASA PAB* has a separately bound Abstract Section (Section 1) and Index Section (Section 2). Although each Abstract Section covers only the indicated six-month period, the Index Section is cumulative covering all NASA-owned inventions announced in *STAR* since May 1969. Thus a complete set of *NASA PAB* would consist of the Abstract Section of Issue 04 (January 1974), the Abstract Section for all subsequent issues, and the Index Section for the most recent issue.

The 193 citations published in this issue of the Abstract Section cover the period July 1974 through December 1974. The Index Section contains references to the 2757 citations covering the period May 1969 through December 1974.

## ABSTRACT SECTION (SECTION 1)

The Abstract Section is divided into 34 subject categories (See Table of Contents for scope note of each category) under which are grouped appropriate NASA inventions. Each entry in the Abstract Section consists of a *STAR* citation accompanied by an abstract and a key illustration taken from the patent or application for patent drawing. Entries are arranged in subject category in order of the ascending NASA Accession Number originally assigned in *STAR* to the invention. The range of NASA Accession Numbers within each issue is printed on the inside front cover.

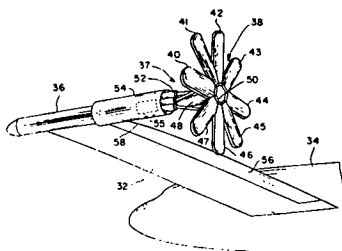
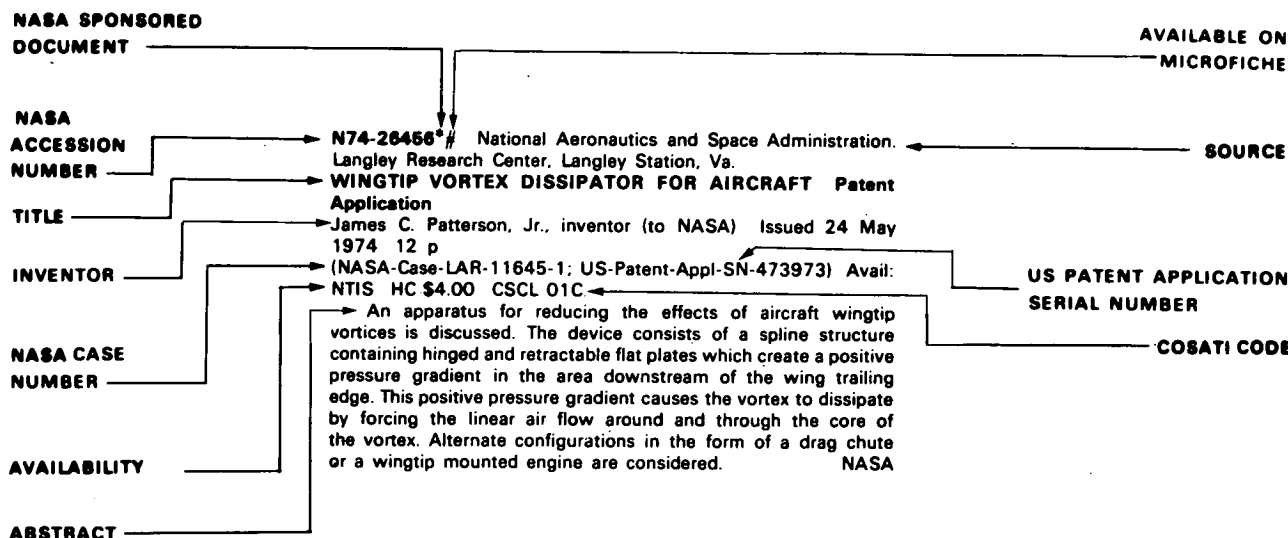
*Abstract Citation Data Elements:* Each of the abstract citations has several data elements useful for identification and indexing purposes, as follows:

NASA Accession Number  
NASA Case Number  
Inventor's Name

Title of Invention  
 U.S. Patent Application Serial Number  
 U.S. Patent Number (for issued patents only)  
 U.S. Patent Office Classification Number(s)  
 (for issued patents only)

These data elements appear in the citation of the abstract as depicted in the Typical Citation and Abstract reproduced below and are also used in the several indexes.

## TYPICAL CITATION AND ABSTRACT FROM *PATENT ABSTRACTS BIBLIOGRAPHY*



**KEY  
 ILLUSTRATION**

## INDEX SECTION (SECTION 2)

The Index Section is divided into five indexes which are cross-indexed and are useful in locating a single invention or groups of inventions.

Each of the five indexes utilizes basic data elements: (1) Subject Category Number, (2) NASA Accession Number, and (3) NASA Case Number, in addition to other specific index terms.

**Subject Index:** Lists all inventions according to appropriate alphabetized technical term and indicates the related NASA Case Number, the Subject Category Number, and the NASA Accession Number.

**Inventor Index:** Lists all inventions according to alphabetized names of inventors and indicates the related NASA Case Number, the Subject Category Number, and the NASA Accession Number.

**Source Index:** Lists all inventions according to alphabetized source of invention (i.e., name of contractor or government installation where invention was made) and indicates the related NASA Case Number, the Subject Category Number, and the NASA Accession Number.

**Number Index:** Lists inventions in order of ascending (1) NASA Case Number, (2) U.S. Patent Application Serial Number, (3) U.S. Patent Classification Number, and (4) U.S. Patent Number and indicates the related Subject Category Number and the NASA Accession Number.

**Accession Number Index:** Lists all inventions in order of ascending NASA Accession Number and indicates the related Subject Category Number, the NASA Case Number, the U.S. Patent Application Serial Number, the U.S. Patent Classification Number, and the U.S. Patent Number.

## HOW TO USE THIS PUBLICATION TO IDENTIFY NASA INVENTIONS

To identify one or more NASA inventions within a specific technical field or subject, several techniques are possible when using the flexibility incorporated into the *NASA PAB*.

(1) *Using Subject Category:* To identify all NASA inventions in any one of the 34 subject categories in this issue of *NASA PAB*, select the desired Subject Category in the Abstract Section and find the inventions abstracted thereunder. The abstracts are arranged in each Subject Category in order of the ascending Accession Number originally assigned in *STAR* to each invention.

(2) *Using Subject Index:* To identify all NASA inventions listed under a desired technical subject index term, (A) turn to the cumulative Subject Index in the Index Section and find the invention(s) listed under the desired technical subject term. (B) Note the indicated

Accession Number and the Subject Category Number. (C) Using the indicated Accession Number, turn to the inside front cover of the Index Section to determine which issue of the Abstract Section includes the Accession Number desired. (D) To find the abstract of the particular invention in the issue of the Abstract Section selected, (i) use the Subject Category and (ii) use the Accession Number to locate the desired invention within the Subject Category listing.

(3) *Using Patent Classification Index:* To identify all inventions covered by issued NASA patents (does not include applications for patent) within a desired Patent Office Classification. (A) turn to the Patent Classification Number in the Number Index of Section 2 and find the associated invention(s), and (B) follow the instructions outlined in (2)(B), and (D) above.

## PUBLIC AVAILABILITY OF COPIES OF PATENTS AND PATENT APPLICATIONS

Copies of U.S. patents may be purchased directly from the U.S. Patent Office, Washington, D.C. 20231, for fifty cents a copy.

Copies of pending NASA applications for patent abstracted in *NASA PAB* are sold by the National Technical Information Service. Springfield, Virginia 22151, at the price shown in the citation. Microfiche are sold at the established unit price of \$2.25. When ordering copies of an application for patent from NTIS, the U.S. Patent Application Serial Number listed in the index or shown in the citation for each abstract should be used to identify the desired application for patent.

### **LICENSES FOR COMMERCIAL USE: INQUIRIES AND APPLICATIONS FOR LICENSE**

NASA inventions, abstracted in *NASA PAB*, are available for nonexclusive or exclusive licensing in accordance with the NASA Patent Licensing Regulations. It is significant that all licenses for NASA inventions shall be by express written instruments and that no license will be granted or implied in a NASA invention except as provided in the NASA Patent Licensing Regulations.

Inquiries concerning the NASA Patent Licensing Program or the availability of licenses for the commercial use of NASA-owned inventions covered by U.S. patents or pending applications for patent should be forwarded to the NASA Patent Counsel of the NASA installation having cognizance of the specific invention, or the Assistant General Counsel for Patent Matters, Code GP, National Aeronautics and Space Administration, Washington, D.C. 20546. Inquiries should refer to the NASA Case Number, the Title of the Invention, and the U.S. Patent Number or the U.S. Application Serial Number assigned to the invention as shown in *NASA PAB*.

The NASA Patent Counsel having cognizance of the invention is determined by the first three letters or prefix of the NASA Case Number assigned to the invention. The addresses of NASA Patent Counsels are listed alongside the NASA Case Number prefix letters in the following table. Formal application of license must be submitted on the NASA Form, Application for NASA Patent License, which is available upon request from any NASA Patent Counsel.



**NASA Case  
Number Pre-  
fix Letters**

ARC-xxxxx  
XAR-xxxxx

ERC-xxxxx  
XER-xxxxx  
HQN-xxxxx  
XHQ-xxxxx

GSC-xxxxx  
XGS-xxxxx

KSC-xxxxx  
XKS-xxxxx

LAR-xxxxx  
XLA-xxxxx

LEW-xxxxx  
XLE-xxxxx

MSC-xxxxx  
XMS-xxxxx

MFS-xxxxx  
XMF-xxxxx

NPO-xxxxx  
XNP-xxxxx  
FRC-xxxxx  
XFR-xxxxx  
WOO-xxxxx

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Goddard Space Flight Center  
Mail Code: 204  
Greenbelt, Maryland 20771  
Telephone: (301)982-2351

John F. Kennedy Space Center  
Mail Code: AA-PAT  
Kennedy Space Center, Florida 32899  
Telephone: (305)867-2544

Langley Research Center  
Mail Code: 456  
Langley Station  
Hampton, Virginia 23365  
Telephone: (804)827-3725

Lewis Research Center  
Mail Code: 500-311  
21000 Brookpark Road  
Cleveland, Ohio 44135  
Telephone: (216)433-6346

Lyndon B. Johnson Space Center  
Mail Code: AM  
Houston, Texas 77058  
Telephone: (713)483-4871

George C. Marshall Space Flight Center  
Mail Code: CCO1  
Huntsville, Alabama 35812  
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NASA Pasadena Office  
Mail Code: 180-601  
4800 Oak Grove Drive  
Pasadena, California 91103  
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# PATENT LICENSING REGULATIONS

## Title 14—AERONAUTICS AND SPACE

### Chapter V—National Aeronautics and Space Administration

#### PART 1245—PATENTS

##### Subpart 2—Patent Licensing Regulations

1. Subpart 2 is revised in its entirety as follows:

Sec.	
1245.200	Scope of subpart.
1245.201	Definitions.
1245.202	Basic considerations.
1245.203	Licenses for practical application of inventions.
1245.204	Other licenses.
1245.205	Publication of NASA inventions available for license.
1245.206	Application for nonexclusive license.
1245.207	Application for exclusive license.
1245.208	Processing applications for license.
1245.209	Royalties and fees.
1245.210	Reports.
1245.211	Revocation of licenses.
1245.212	Appeals.
1245.213	Litigation.
1245.214	Address of communications.

**AUTHORITY:** The provisions of this Subpart 2 issued under 42 U.S.C. 2457, 2473(b)(3).

##### § 1245.200 Scope of subpart.

This Subpart 2 prescribes the terms, conditions, and procedures for licensing inventions covered by U.S. patents and patent applications for which the Administrator of the National Aeronautics and Space Administration holds title on behalf of the United States.

##### § 1245.201 Definitions.

For the purpose of this subpart, the following definitions apply:

(a) "Invention" means an invention covered by a U.S. patent or patent application for which the Administrator of NASA holds title on behalf of the United States and which is designated by the Administration as appropriate for the grant of license(s) in accordance with this subpart.

(b) "To practice an invention" means to make or have made, use or have used, sell or have sold, or otherwise dispose of according to law any machine, article of manufacture or composition of matter physically embodying the invention, or to use or have used the process or method comprising the invention.

(c) "Practical application" means the manufacture in the case of a composition of matter or product, the use in the case of a process, or the operation in the case of a machine, under such conditions as to establish that the invention is being utilized and that its benefits are reasonably accessible to the public.

(d) "Special invention" means any invention designated by the NASA Assistant General Counsel for Patent Matters to be subject to short-form licensing procedures. An invention may be designated as a special invention when a determination is made that:

(1) Practical application has occurred and is likely to continue for the life of

the patent and for which an exclusive license is not in force, or

(2) The public interest would be served by the expeditious granting of a nonexclusive license for practice of the invention by the public.

(e) The "Administrator" means the Administrator of the National Aeronautics and Space Administration, or his designee.

(f) "Government" means the Government of the United States of America.

(g) The "Inventions and Contributions Board" means the NASA Inventions and Contributions Board established by the Administrator of NASA within the Administration in accordance with section 305 of the National Aeronautics and Space Act of 1958 as amended (42 U.S.C. 2457).

##### § 1245.202 Basic considerations.

(a) Much of the new technology resulting from NASA sponsored research and development in aeronautical and space activities has application in other fields. NASA has special authority and responsibility under the National Aeronautics and Space Act of 1958, as amended (42 U.S.C. 2451), to provide for the widest practical dissemination and utilization of this new technology. In addition, NASA has been given unique requirements to protect the inventions resulting from NASA activities and to promulgate licensing regulations to encourage commercial use of these inventions.

(b) NASA-owned inventions will best serve the interests of the United States when they are brought to practical application in the shortest time possible. Although NASA encourages the non-exclusive licensing of its inventions to promote competition and achieve their widest possible utilization, the commercial development of certain inventions calls for a substantial capital investment which private manufacturers may be unwilling to risk under a nonexclusive license. It is the policy of NASA to seek exclusive licensees when such licenses will provide the necessary incentive to the licensee to achieve early practical application of the invention.

(c) The Administrator, in determining whether to grant an exclusive license, will evaluate all relevant information submitted by applicants and all other persons and will consider the necessity for further technical and market development of the invention, the capabilities of prospective licensees, their proposed plans to undertake the required investment and development, the impact on competitors, and the benefits of the license to the Government and to the public. Preference for exclusive license shall be given to U.S. citizens or companies who intend to manufacture or use, in the case of a process, the invention in the United States of America, its territories and possessions. Consideration may also be given to assisting small businesses and minority business enterprises, as well as economically depressed, low income and labor surplus areas.

(d) All licenses for inventions shall

be by express written instruments. No license shall be granted either expressly or by implication, for a NASA invention except as provided for in §§ 1245.203 and 1245.204 and in any existing or future treaty or agreement between the United States and any foreign government.

(e) Licenses for inventions covered by NASA-owned foreign patents and patent applications shall be granted in accordance with the NASA Foreign Patent Licensing Regulations (§ 1245.4).

##### § 1245.203 Licenses for practical application of inventions.

(a) *General.* As an incentive to encourage practical application of inventions, licenses will be granted to responsible applicants according to the circumstances and conditions set forth in this section.

(b) *Nonexclusive licenses.* (1) Each invention will be made available to responsible applicants for nonexclusive, revocable licensing in accordance with § 1245.206, consistent with the provisions of any existing exclusive license.

(2) The duration of the license shall be for a period as specified in the license.

(3) The license shall require the licensee to achieve the practical application of the invention and to then practice the invention for the duration of the license.

(4) The license may be granted for all or less than all fields of use of the invention and throughout the United States of America, its territories and possessions, Puerto Rico, and the District of Columbia, or in any lesser geographic portion thereof.

(5) The license shall extend to the subsidiaries and affiliates of the licensee and shall be nonassignable without approval of the Administrator, NASA, except to the successor of that part of the licensee's business to which the invention pertains.

(c) *Short-form nonexclusive licenses.* A nonexclusive, revocable license for a special invention, as defined in § 1245.201 (d), shall be granted upon written request, to any applicant by the Patent Counsel of the NASA installation having cognizance of the invention.

(d) *Exclusive licenses.* (1) A limited exclusive license may be granted on an invention available for such licensing provided that:

(i) The Administrator has determined that: (a) The invention has not been brought to practical application by a nonexclusive licensee in the fields of use or in the geographical locations covered by the application for the exclusive license, (b) practical application of the invention in the fields of use or geographical locations covered by the application for the exclusive license is not likely to be achieved expeditiously by the further funding of the invention by the Government or under a nonexclusive license requested by any applicant pursuant to these regulations, and (c) the exclusive license will provide the necessary incentive to the licensee to achieve the practical application of the invention; and

(ii) Either a notice pursuant to

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§ 1245.205 listing the invention as available for licensing has been published in the FEDERAL REGISTER for at least 9 months; or a patent covering the invention has been issued for at least 6 months. However, a limited exclusive license may be granted prior to the periods specified above if the Administrator determines that the public interest will best be served by the earlier grant of an exclusive license.

(2) The license may be granted for all or less than all fields of use of the invention, and throughout the United States of America, its territories and possessions, Puerto Rico, and the District of Columbia, or in any lesser geographic portion thereof.

(3) The exclusive period of the license shall be negotiated, but shall be for less than the terminal portion of the patent, and shall be related to the period necessary to provide a reasonable incentive to invest the necessary risk capital.

(4) The license shall require the licensee to practice the invention within a period specified in the license and then to achieve practical application of the invention.

(5) The license shall require the licensee to expend a specified minimum sum of money and/or to take other specified actions, within indicated period(s) after the effective date of the license, in an effort to achieve practical application of the invention.

(6) The license shall be subject to at least an irrevocable royalty-free right of the Government of the United States to practice and have practiced the invention throughout the world by or on behalf of the Government of the United States and on behalf of any foreign government pursuant to any existing or future treaty or agreement with the United States.

(7) The license may reserve to the Administrator, NASA, under the following circumstances, the right to require the granting of a sublicense to responsible applicant(s) on terms that are considered reasonable by the Administrator, taking into consideration the current royalty rates under similar patents and other pertinent facts: (i) To the extent that the invention is required for public use by Government regulation, or (ii) as may be necessary to fulfill health or safety needs, or (iii) for other purposes stipulated in the license.

(8) The license shall be nontransferable except to the successor of that part of the licensee's business to which the invention pertains.

(9) Subject to the approval of the Administrator, the licensee may grant sublicenses under the license. Each sublicense granted by an exclusive licensee shall make reference to and shall provide that the sublicense is subject to the terms of the exclusive license including the rights retained by the Government under the exclusive license. A copy of each sublicense shall be furnished to the Administrator.

(10) The license may be subject to such other reservations as may be in the public interest.

hereby granted to the contractor reporting an invention made in the performance of work under a contract of NASA in the manner specified in section 305(a) (1) or (2) of the National Aeronautics and Space Act of 1958 as amended (42 U.S.C. 2457(a) (1) or (2)), a revocable, nonexclusive, royalty-free license for the practice of such invention, together with the right to grant sublicenses of the same scope to the extent the contractor was legally obligated to do so at the time the contract was awarded. Such license and right is nontransferable except to the successor of that part of the contractor's business to which the invention pertains.

(b) *Miscellaneous licenses.* Subject to any outstanding licenses, nothing in this subpart 2 shall preclude the Administrator from granting other licenses for inventions, when he determines that do so would provide for an equitable distribution of rights. The following exemplify circumstances wherein such licenses may be granted:

(1) In consideration of the settlement of an interference;

(2) In consideration of a release of a claim of infringement; or

(3) In exchange for or as part of the consideration for a license under adversely held patent(s).

§ 1245.205 Publication of NASA inventions available for license.

(a) A notice will be periodically published in the FEDERAL REGISTER listing inventions available for licensing. Abstracts of the inventions will also be published in the NASA Scientific and Technical Aerospace Reports (STAR) and other NASA publications.

(b) Copies of pending patent applications for inventions abstracted in STAR may be purchased from the National Technical Information Service, Springfield, Va. 22151.

§ 1245.206 Application for nonexclusive license.

(a) *Submission of application.* An application for nonexclusive license under § 1245.203(b) or a short-form nonexclusive license for special inventions under § 1245.203(c) shall be addressed to the NASA Patent Counsel of the NASA Installation having cognizance over the NASA invention for which a license is desired or to the NASA Assistant General Counsel for Patent Matters.

(b) *Contents of an application for nonexclusive license.* An application for nonexclusive license under § 1245.203(b) shall include:

(1) Identification of invention for which license is desired, including the NASA patent case number, patent application serial number of patent number, title and date, if known;

(2) Name and address of the person, company or organization applying for license and whether the applicant is a U.S. citizen or a U.S. corporation;

(3) Name and address of representative of applicant to whom correspondence should be sent;

(4) Nature and type of applicant's business;

(5) Number of employees;

(6) Purpose for which license is desired;

(7) A statement that contains the applicant's best knowledge of the extent to which the invention is being practiced by private industry and the Government;

(8) A description of applicant's capability and plan to undertake the development and marketing required to achieve the practical application of the invention, including the geographical location where the applicant plans to manufacture or use, in the case of a process, the invention; and

(9) A statement indicating the minimum term of years the applicant desires to be licensed.

(c) *Contents of an application for a short-form nonexclusive license.* An application for a short-form nonexclusive license under § 1245.203(c) for a special invention shall include:

(1) Identification of invention for which license is desired, including the NASA patent case number, patent application serial number or patent number, title and date, if known;

(2) Name and address of company or organization applying for license; and

(3) Name and address of representative of applicant to whom correspondence should be sent.

§ 1245.207 Application for exclusive license.

(a) *Submission of application.* An application for exclusive license under § 1245.203(d) may be submitted to NASA at any time. An application for exclusive license shall be addressed to the NASA Assistant General Counsel for Patent Matters.

(b) *Contents of an application for exclusive license.* In addition to the requirements set forth in § 1245.206(b), the application for an exclusive license shall include:

(1) Applicant's status, if any, in any one or more of the following categories:

(i) Small business firm;

(ii) Minority business enterprise;

(iii) Location in a surplus labor area;

(iv) Location in a low-income urban area; and

(v) Location in an area designed by the Government as economically depressed.

(2) A statement indicating the time, expenditure, and other acts which the applicant considers necessary to achieve practical application of the invention, and the applicant's offer to invest that sum and to perform such acts if the license is granted;

(3) A statement whether the applicant would be willing to accept a license for all or less than all fields of use of the invention throughout the United States of America, its territories and possessions, Puerto Rico, and the District of Columbia, or in any lesser geographic portion thereof.

(4) A statement indicating the amount of royalty fees or other consideration, if any, the applicant would be willing to pay the Government for the exclusive license; and

(5) Any other facts which the applicant believes to show it to be in the interests of the United States of America for the Administrator to grant an exclusive license rather than a nonexclusive li-

### § 1245.204 Other licenses.

(a) *License to contractor.* There is

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cense and that such an exclusive license should be granted to the applicant.

### § 1245.208 Processing applications for license.

(a) *Initial review.* Applications for nonexclusive and exclusive licenses under §§ 1245.206 and 1245.207 will be reviewed by the Patent Counsel of the NASA installation having cognizance for the invention and the NASA Assistant General Counsel for Patent Matters, to determine the conformity and appropriateness of the application for license and the availability of the specific invention for the license requested. The Assistant General Counsel for Patent Matters will forward all applications for license conforming to §§ 1245.206(b) and 1245.207(b) to the NASA Inventions and Contributions Board when the invention is available for consideration of the requested license. Prior to forwarding applications for exclusive licenses to the Inventions and Contributions Board, notice in writing will be given to each nonexclusive licensee for the specific invention advising of the receipt of the application for the exclusive license and providing each nonexclusive licensee with a 30-day period for submitting either evidence that practical application of the invention has occurred or is about to occur or, an application for an exclusive license for the invention.

(b) *Recommendations of Inventions and Contributions Board.* The Inventions and Contributions Board shall, in accordance with the basic considerations set forth in §§ 1245.202 and 1245.203, evaluate all applications for license forwarded by the Assistant General Counsel for Patent Matters. Based upon the facts presented to the Inventions and Contributions Board in the application and any other facts in its possession, the Inventions and Contributions Board shall recommend to the Administrator: (1) Whether a nonexclusive or exclusive license should be granted, (2) the identity of the licensee, and (3) any special terms or conditions of the license.

(c) *Determination of Administrator and grant of nonexclusive licenses.* The Administrator shall review the recommendations of the Inventions and Contributions Board and shall determine whether to grant the nonexclusive license as recommended by the Board. If the Administrator determines to grant the license, the license will be granted upon the negotiation of the appropriate terms and conditions of the Office of General Counsel.

(d) *Determination of Administrator and grant of exclusive licenses—(1) Notice.* If the Administrator determines that the best interest of the United States will be served by the granting of an exclusive license in accordance with the basic considerations set forth in §§ 1245.202 and 1245.203, a notice shall be published in the FEDERAL REGISTER announcing the intent to grant the exclusive license, the identification of the invention, special terms or conditions of the proposed license, and a statement that NASA will grant the exclusive license unless within 30 days of the publication of such notice the Inventions and Contributions Board receives in writing

any of the following together with supporting documentation:

(i) A statement from any person setting forth reasons why it would not be in the best interest of the United States to grant the proposed exclusive license; or

(ii) An application for a nonexclusive license under such invention, in accordance with § 1245.206(b), in which applicant states that he has already brought or is likely to bring the invention to practical application within a reasonable period.

The Inventions and Contributions Board shall, upon receipt of a written request within the 30 days' notice period, grant an extension of 30 days for the submission of the documents designated above.

(2) *Recommendation of Inventions and Contributions Board.* Upon the expiration of the period required by subparagraph (1) of this paragraph, the Board shall review all written responses to the notice and shall then recommend to the Administrator whether to grant the exclusive license as the Board initially recommended or whether a different form of license, if any, should instead be granted.

(3) *Grant of exclusive licenses.* The Administrator shall review the Board's recommendation and shall determine if the interest of the United States would best be served by the grant of an exclusive license as recommended by the Board. If the Administrator determines to grant the exclusive license, the license will be granted upon the negotiation of the appropriate terms and conditions by the Office of General Counsel.

### § 1245.209 Royalties and fees.

(a) Normally, a nonexclusive license for the practical application of an invention granted to a U.S. citizen or company will not require the payment of royalties; however, NASA may require other consideration.

(b) An exclusive license for an invention may require the payment of royalties, fees or other consideration when the licensing circumstances and the basic considerations in § 1245.202, considered together, indicate that it is in the public interest to do so.

### § 1245.210 Reports.

A license shall require the licensee to submit periodic reports of his efforts to work the invention. The reports shall contain information within his knowledge, or which he may acquire under normal business practice, pertaining to the commercial use that is being made of the invention and such other information which the Administrator may determine pertinent to the licensing program and which is specified in the license.

### § 1245.211 Revocation of licenses.

(a) Any license granted pursuant to § 1245.203 may be revoked, either in part or in its entirety, by the Administrator if in his opinion the licensee at any time shall fail to use adequate efforts to bring to or achieve practical application of the invention in accordance with the terms of the license, or if the licensee at any

time shall default in making any report required by the license, or shall make any false report, or shall commit any breach of any covenant or agreement therein contained, and shall fail to remedy any such default, false report, or breach within 30 days after written notice, or if the patent is deemed unenforceable either by the Attorney General or a final decision of a U.S. court.

(b) Any license granted pursuant to § 1245.204(a) may be revoked, either in part or in its entirety, by the Administrator if in his opinion such revocation is necessary to achieve the earliest practical application of the invention pursuant to an application for exclusive license submitted in accordance with § 1245.207, or the licensee at any time shall breach any covenant or agreement contained in the license, and shall fail to remedy any such breach within 30 days after written notice thereof.

(c) Before revoking any license granted pursuant to this Subpart 2 for any cause, there will be furnished to the licensee a written notice of intention to revoke the license, and the licensee will be allowed 30 days after such notice in which to appeal and request a hearing before the Inventions and Contributions Board on the question of revocation. After a hearing, the Inventions and Contributions Board shall transmit to the Administrator the record of proceedings, its findings of fact, and its recommendation whether the license should be revoked either in part or in its entirety. The Administrator shall review the recommendation of the Board and determine whether to revoke the license in part or in its entirety. Revocation of a license shall include revocation of all sublicenses which have been granted.

### § 1245.212 Appeals.

Any person desiring to file an appeal pursuant to § 1245.211(c) shall address the appeal to Chairman, Inventions and Contributions Board. Any person filing an appeal shall be afforded an opportunity to be heard before the Inventions and Contributions Board, and to offer evidence in support of his appeal. The procedures to be followed in any such matter shall be determined by the Administrator. The Board shall make findings of fact and recommendations with respect to disposition of the appeal. The decision on the appeal shall be made by the Administrator, and such decision shall be final and conclusive, except on questions of law, unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence.

### § 1245.213 Litigation.

An exclusive licensee shall be granted the right to sue at his own expense any party who infringes the rights set forth in his license and covered by the licensed patent. The licensee may join the Government, upon consent of the Attorney General, as a party complainant in such suit, but without expense to the Government and the licensee shall pay costs and any final judgment or decree that may be rendered against the Govern-

## PATENT LICENSING REGULATIONS

ment in such suit. The Government shall also have an absolute right to intervene in any such suit at its own expense. The licensee shall be obligated to promptly furnish to the Government, upon request, copies of all pleadings and other papers filed in any such suit and of evidence adduced in proceedings relating to the licensed patent including, but not limited to, negotiations for settlement and agreements settling claims by a licensee based on the licensed patent, and all other books, documents, papers, and

records pertaining to such suit. If, as a result of any such litigation, the patent shall be declared invalid, the licensee shall have the right to surrender his license and be relieved from any further obligation thereunder.

### § 1245.214 Address of communications.

(a) Communications to the Assistant General Counsel for Patent Matters in accordance with §§ 1245.206 and 1245.207 and requests for information concerning licenses for NASA inventions should be

addressed to the Assistant General Counsel for Patent Matters, Code GP, National Aeronautics and Space Administration, Washington, D.C. 20546.

(b) Communications to the Inventions and Contributions Board in accordance with §§ 1245.208, 1245.211, and 1245.212 should be addressed to Chairman, Inventions and Contributions Board, National Aeronautics and Space Administration, Washington, D.C. 20546.

*Effective date.* The regulations set forth in this subpart 2 are effective April 1, 1972.

JAMES C. FLETCHER,  
Administrator.

## NASA FOREIGN PATENT LICENSING REGULATIONS

Selected NASA inventions are also available for licensing in countries other than the United States in accordance with the NASA Foreign Patent Licensing Regulation (14 C.F.R. 1245.4), a copy of which is available from any NASA Patent Counsel.

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## Section 1 • Abstracts

### Subject Categories

*Abstracts in the bibliography are grouped under the following categories:*

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<b>01 Aerodynamics</b>	<b>1</b>
Includes aerodynamics of bodies, combinations, internal flow in ducts and turbomachinery; wings, rotors, and control surfaces. For applications see: 02 Aircraft and 32 Space Vehicles. For related information see also: 12 Fluid Mechanics; and 33 Thermodynamics and Combustion.	
<b>02 Aircraft</b>	<b>2</b>
Includes fixed-wing airplanes, helicopters, gliders, balloons, ornithopters, etc.; and specific types of complete aircraft (e.g., ground effect machines, STOL, and VTOL); flight tests; operating problems (e.g., sonic boom); safety and safety devices; economics; and stability and control. For basic research see: 01 Aerodynamics. For related information see also: 31 Space Vehicles; and 32 Structural Mechanics.	
<b>03 Auxiliary Systems</b>	<b>4</b>
Includes fuel cells, energy conversion cells, and solar cells; auxiliary gas turbines; hydraulic, pneumatic and electrical systems; actuators; and inverters. For related information see also: 09 Electronic Equipment; 22 Nuclear Engineering; and 28 Propulsion Systems.	
<b>04 Biosciences</b>	<b>6</b>
Includes aerospace medicine, exobiology, radiation effects on biological systems; physiological and psychological factors. For related information see also: 05 Biotechnology.	
<b>05 Biotechnology</b>	<b>7</b>
Includes life support systems, human engineering, protective clothing and equipment; crew training and evaluation, and piloting. For related information see also: 04 Biosciences.	
<b>06 Chemistry</b>	<b>10</b>
Includes chemical analysis and identification (e.g., spectroscopy). For applications see: 17 Materials, Metallic; 18 Materials, Nonmetallic; and 27 Propellants.	
<b>07 Communications</b>	<b>11</b>
Includes communications equipment and techniques, noise; radio and communications blackout; modulation telemetry; tracking radar and optical observation; and wave propagation. For basic research see: 23 Physics, General; and 21 Navigation.	

<b>08 Computers</b>	<b>15</b>
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<b>09 Electronic Equipment</b>	<b>16</b>
Includes electronic test equipment and maintainability; component parts, e.g., electron tubes, tunnel diodes, transistors, integrated circuitry; microminiaturization. For basic research see: 10 Electronics. For related information see also: 07 Communications and 21 Navigation.	
<b>10 Electronics</b>	<b>23</b>
Includes circuit theory; and feedback and control theory. For applications see: 09 Electronic Equipment. For related information see specific Physics categories.	
<b>11 Facilities, Research and Support</b>	<b>25</b>
Includes airports; lunar and planetary bases including associated vehicles; ground support systems; related logistics; simulators; test facilities (e.g., rocket engine test stands, shock tubes, and wind tunnels); test ranges; and tracking stations.	
<b>12 Fluid Mechanics</b>	<b>27</b>
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<b>13 Geophysics</b>	<b>29</b>
Includes aeronomy; upper and lower atmosphere studies; oceanography; cartography; and geodesy. For related information see also: 20 Meteorology; 29 Space Radiation; and 30 Space Sciences.	
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<b>18 Materials, Nonmetallic</b>	<b>57</b>
Includes corrosion; physical and mechanical properties of materials (e.g., plastics); and elastomers, hydraulic fluids, etc. For basic research see: 06 Chemistry. For related information see also: 17 Materials, Metallic; 27 Propellants; and 32 Structural Mechanics.	
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**28 Propulsion Systems** **69**  
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**30 Space Sciences** **No Abstracts**  
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**32 Structural Mechanics** **74**  
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**33 Thermodynamics and Combustion** **75**  
Includes ablation, cooling, heating, heat transfer, thermal balance, and other thermal effects; and combustion theory. For related information see also: 12 Fluid Mechanics; and 27 Propellants.

**34 General** **No Abstracts**  
Includes information of a broad nature related to industrial applications and technology, and to basic research; defense aspects; information retrieval; management; law and related legal matters; and legislative hearings and documents.

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JANUARY 1975 (Supplement 6)

## NASA Patent Abstracts Bibliography

*A Semiannual Publication of the National Aeronautics and Space Administration*

### 01 AERODYNAMICS

Includes aerodynamics of bodies, combinations, internal flow in ducts and turbomachinery; wings, rotors, and control surfaces. For applications see: 02 Aircraft and 31 Space Vehicles. For related information see also: 12 Fluid Mechanics; and 33 Thermodynamics and Combustion.

**N74-30414\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

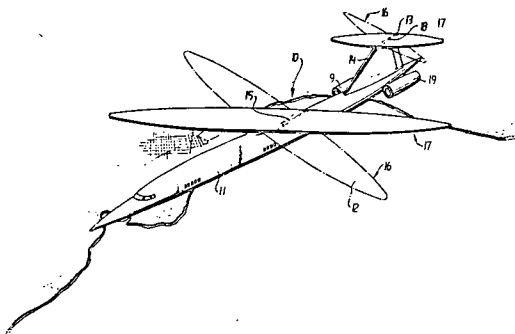
**SINGLE WING SUPERSONIC AIRCRAFT Patent Application**

Robert T. Jones, inventor (to NASA) Filed 12 Aug. 1974 40 p

(NASA-Case-ARC-10470-3; US-Patent-Appl-SN-496779) Avail: NTIS HC \$5.00 CSCL 01C

An aircraft is described, having a single fuselage with a main wing and a horizontal stabilizer airfoil pivotally attached at their centers to the fuselage. The pivotal attachments allow the airfoils to be yawed relative to the fuselage for high speed flight, and to be positioned at right angles with respect to the fuselage during takeoff, landing, and low speed flight. The main wing and the horizontal stabilizer are upwardly curved from their center pivotal connections towards their ends to form curvilinear dihedrals.

NASA





## 02 AIRCRAFT

Includes fixed-wing airplanes, helicopters, gliders, balloons, ornithopters, etc.; and specific types of complete aircraft (e.g., ground effect machines, STOL, and VTOL); flight tests; operating problems (e.g., sonic boom); safety and safety devices; economics; and stability and control. For basic research see: 01 Aerodynamics. For related information see also: 31 Space Vehicles; and 32 Structural Mechanics.

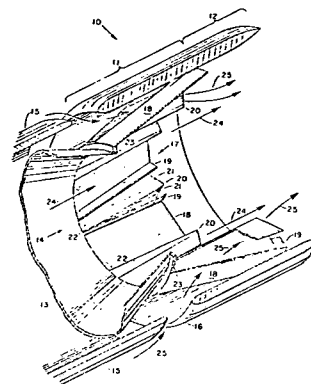
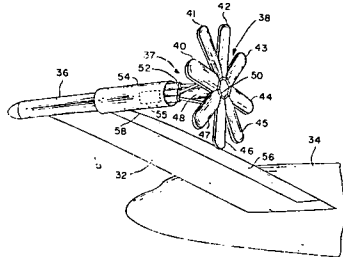
**N74-26456\*** National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

**WINGTIP VORTEX DISSIPATOR FOR AIRCRAFT Patent Application**

James C. Patterson, Jr., inventor (to NASA) Issued 24 May 1974 12 p

(NASA-Case-LAR-11645-1; US-Patent-Appl-SN-473973) Avail: NTIS HC \$4.00 CSCL 01C

An apparatus for reducing the effects of aircraft wingtip vortices is discussed. The device consists of a spline structure containing hinged and retractable flat plates which create a positive pressure gradient in the area downstream of the wing trailing edge. This positive pressure gradient causes the vortex to dissipate by forcing the linear air flow around and through the core of the vortex. Alternate configurations in the form of a drag chute or a wingtip mounted engine are considered. NASA



**N74-30421\*** National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

**DEPLOYABLE FLEXIBLE VENTRAL FINS FOR USE AS AN EMERGENCY SPIN RECOVERY DEVICE IN AIRCRAFT Patent**

Sanger M. Burk, Jr., inventor (to NASA) Issued 30 Jul. 1974 13 p Filed 14 Sep. 1972 Supersedes N73-10031 (11 - 01, p 0004)

(NASA-Case-LAR-10753-1; US-Patent-3,826,448;

US-Patent-Appl-SN-289018; US-Patent-Class-244-91;

US-Patent-Class-244-327; US-Patent-Class-244-90R) Avail: US Patent Office CSCL 01B

A flexible fin device for mounting on an aircraft to effect spin recovery is described. The device may be selectively deployed to provide a triangular planform of flexible material to provide spin recovery, and retracted for compact storage during non-use. A single flexible fin may be deflected in a specific direction depending on direction of spin rotation, or two flexible fins forming an inverted V configuration may be used. The device is mounted on the underbody of the aircraft.

Official Gazette of the U.S. Patent Office

**N74-27490\*** National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

**JET EXHAUST NOISE SUPPRESSOR Patent**

Ronald G. Huff, inventor (to NASA) Issued 28 Jun. 1974 4 p Filed 9 Mar. 1973 Supersedes N73-21066 (11 - 12, p 1364)

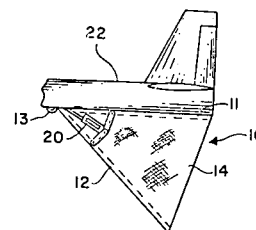
(NASA-Case-LEW-11286-1; US-Patent-3,820,630;

US-Patent-Appl-SN-339806; US-Patent-Class-181-33HB;

US-Patent-Class-239-265.17) Avail: US Patent Office CSCL 01C

Noise suppression for a jet engine exhaust is provided by an annular divergent body attached to an exhaust nozzle. The smallest diameter of the divergent body is larger than the diameter of the exhaust nozzle exit to form an annular step which produces a shock wave in the exhaust as it passes the step. An annular shroud is disposed around the divergent body and causes outside air to pass through voids in the divergent body to mix with the jet exhaust gas. The divergent body includes a plurality of channels with separators between the channels.

Official Gazette of the U.S. Patent Office



**N74-32418\*** National Aeronautics and Space Administration.  
Langley Research Center, Langley Station, Va.

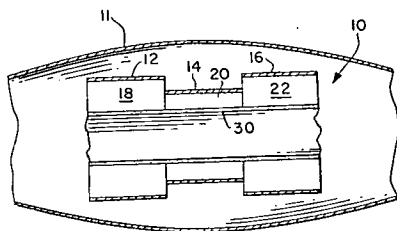
**NOISE SUPPRESSOR Patent**

William E. Zorumski, inventor (to NASA) Issued 20 Aug. 1974  
13 p Filed 14 May 1973 Supersedes N73-22975 (11 - 14,  
p 1600)

(NASA-Case-LAR-11141-1; US-Patent-3,830,335;  
US-Patent-Appl-SN-359957; US-Patent-Class-181-33F;  
US-Patent-Class-181-33C; US-Patent-Class-181-33H;  
US-Patent-Class-181-33L; US-Patent-Class-181-42) Avail: US  
Patent Office CSCL 20A

A tuned noise suppressor is described consisting of annular acoustically porous elements for incorporation into the inlet and exhaust ducts of turbofan engines. The apparatus uses sound wave absorption, reflection, and incompatibility for achieving high noise reduction in the short distance. In addition, it has a duct of uniform inner diameter which does not block the duct flow.

Official Gazette of the U.S. Patent Office



**N74-34475\*#** National Aeronautics and Space Administration.  
Ames Research Center, Moffett Field, Calif.

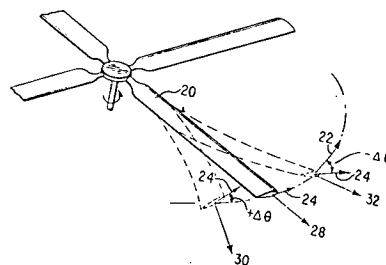
**HINGELESS HELICOPTER ROTOR WITH IMPROVED STABILITY Patent Application**

Robert A. Ormiston, William G. Bousman, Dewey H. Hodges, and David A. Peters, inventors (to NASA) Filed 10 Oct. 1974  
22 p Prepared in cooperation with Army Air Mobility R and D Lab.

(NASA-Case-ARC-10807-1; US-Patent-Appl-SN-513612) Avail:  
NTIS HC \$4.25 CSCL 01B

Improved stability is provided in a hingeless helicopter rotor by inclining the principal elastic flexural axes and coupling pitching of the rotor blade with the lead-lag bending of the blade. The primary elastic flex axes can be inclined by constructing the blade of materials that display nonuniform stiffness. The specification describes various cross section distributions and the inclined flex axes resulting therefrom. Also described are arrangements for varying the pitch of the rotor blade in a predetermined relationship with lead-lag bending of the blade, i.e., bending of the blade in a plane parallel to its plane of rotation.

NASA



**N74-32428\*#** National Aeronautics and Space Administration.  
Ames Research Center, Moffett Field, Calif.

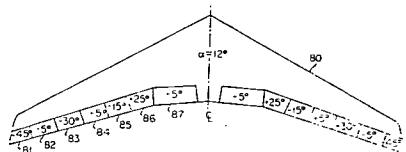
**APPARATUS FOR SPAN LOADING TO ALLEVIATE WAKE-VORTEX HAZARD BEHIND AIRCRAFT Patent Application**

Vernon J. Rossow, inventor (to NASA) Filed 17 Sep. 1974  
29 p

(NASA-Case-ARC-10801-1; US-Patent-Appl-SN-506802) Avail:  
NTIS HC \$4.50 CSCL 01C

The aerodynamic configuration of a swept back aircraft wing for alleviating the wake-vortex hazard behind the aircraft is discussed. The airflow behind the wing is altered by deployment of segmented flaps to produce tailored span loading. Sawtooth span loading is used to generate a translating sheet of air flow energy which develops several unequal vortex pairs which break up the turbulent wake. Diagrams of the wing planforms and the resulting wake distribution are provided.

NASA



## 03 AUXILIARY SYSTEMS

Includes fuel cells, energy conversion cells, and solar cells; auxiliary gas turbines, hydraulic, pneumatic and electrical systems; actuators; and inverters. For related information see also: 09 Electronic Equipment; Nuclear Engineering; and 28 Propulsion Systems.

**N74-27519\*** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

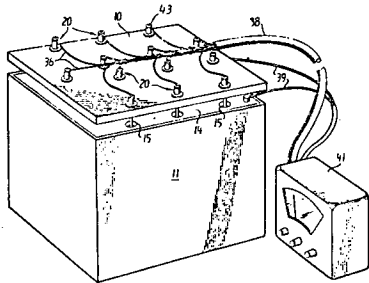
### BATTERY TESTING DEVICE Patent

William A. Boshers, inventor (to NASA) Issued 18 Jun. 1974 5 p Filed 24 Jan. 1973 Supersedes N73-17037 (11 - 08, p 0869)

(NASA-Case-MFS-20761-1; US-Patent-3,818,325; US-Patent-Appl-SN-326327; US-Patent-Class-324-29.5; US-Patent-Class-324-72.5; US-Patent-Class-136-182) Avail: US Patent Office CSDL 10C

A battery testing device is described for testing the cells of a multiple-cell battery, the battery having a cover plate with access holes to provide access to the connecting straps between cells. A panel of probe assembly receiving holes is located to correspond to the location of the access holes when the panel is positioned on top of the battery. A probe assembly is positioned within each probe assembly receiving hole, with a spring biased electrically conductive plunger to make electrical contact with the connecting strap through the corresponding access hole when the panel is pushed towards the top of the battery.

Official Gazette of the U.S. Patent Office



**N74-29410\*** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

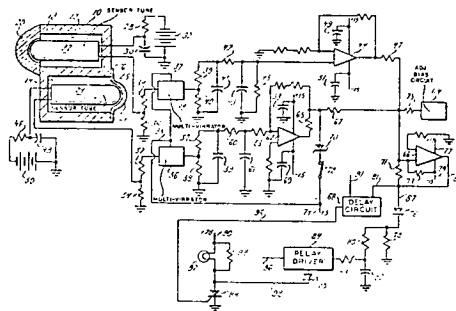
### FLAME DETECTOR OPERABLE IN PRESENCE OF PROTON RADIATION Patent

Dayton J. Walker (McDonnell-Douglas Corp., Huntington Beach, Calif.), John E. Turnage (McDonnell-Douglas Corp., Huntington Beach, Calif.), Rodney M. F. Linford (McDonnell-Douglas Corp., Huntington Beach, Calif.), and Steve D. Cornish, inventors (to NASA) (McDonnell-Douglas Corp., Huntington Beach, Calif.) Issued 23 Jul. 1974 10 p Filed 21 Mar. 1973 Supersedes N73-20042 (11 - 11, p 1237) Sponsored by NASA

(NASA-Case-MFS-21577-1; US-Patent-3,825,760; US-Patent-Appl-SN-343308; US-Patent-Class-250-372; US-Patent-Class-250-394) Avail: US Patent Office CSDL 01C

A detector of ultraviolet radiation for operation in a space vehicle which orbits through high intensity radiation areas is described. Two identical ultraviolet sensor tubes are mounted within a shield which limits to acceptable levels the amount of proton radiation reaching the sensor tubes. The shield has an opening which permits ultraviolet radiation to reach one of the sensing tubes. The shield keeps ultraviolet radiation from reaching the other sensor tube, designated the reference tube. The circuitry of the detector subtracts the output of the reference tube from the output of the sensing tube, and any portion of the output of the sensing tube which is due to proton radiation is offset by the output of the reference tube. A delay circuit in the detector prevents false alarms by keeping statistical variations in the proton radiation sensed by the two sensor tubes from developing an output signal.

Official Gazette of the U.S. Patent Office



**N74-29416\*** National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

### ELECTROLYTIC CELL DESIGN Patent Application

David F. Putnam (McDonnell-Douglas Corp.) and Richard L. Vaughan, inventors (to NASA) (McDonnell-Douglas Corp.) Issued 8 Feb. 1974 10 p Sponsored by NASA

(NASA-Case-LAR-11042-1; US-Patent-Appl-SN-440916) Avail: NTIS HC \$4.00 CSDL 10A

An electrolytic cell is made up of a stack of polysulfone plates faced with sheets of platinum bonded by silicone rubber and mechanically secured to their plates by Teflon screws having heads serving as spacers between opposed platinum sheets.

NASA



**N74-30448\*** National Aeronautics and Space Administration, Pasadena Office, Calif.

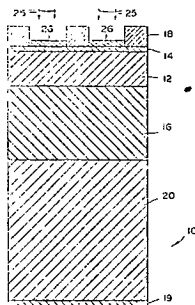
**HIGH VOLTAGE, HIGH CURRENT SCHOTTKY BARRIER SOLAR CELL Patent Application**

Richard J. Stirn, inventor (to NASA) (JPL) Filed 5 Aug. 1974 15 p

(Contract NAS7-100)

(NASA-Case-NPO-13482-1; US-Patent-Appl-SN-495021) Avail: NTIS HC \$4.00 CSCL 10A

A Schottky barrier solar cell is described which consists of a layer of wide band gap semiconductor material on which a very thin film of semi-transparent metal is deposited to form the barrier. The layer of the wide band gap semiconductor material is on top of a layer of narrower band gap semiconductor material, to which one of the cell's contacts may be attached directly, or through a substrate. The cell's other contact is a grid structure which is deposited on the thin metal film. NASA



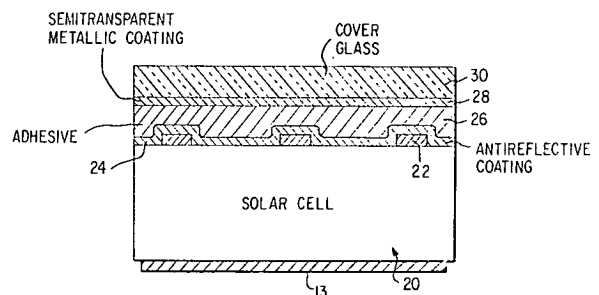
**N74-33484\*** National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

**SOLAR CELL ASSEMBLY Patent Application**

Henry W. Brandhorst, Jr., inventor (to NASA) Filed 30 Sep. 1974 13 p

(NASA-Case-LEW-11549-1; US-Patent-Appl-SN-510677) Avail: NTIS HC \$4.00 CSCL 10A

An improved solar cell assembly is provided for use under high intensity illumination conditions where heat is a problem. The solar cell assembly includes a solar cell with an overlay of a semi-transparent coating of a metal such as aluminum or silver, which covers the entire surface. The purpose of the coating is to lower the amount of incident radiation on the cell and thereby lower cell temperature. Use of the semi-transparent coating over the entire cell surface uniformly limits incident radiation and hence reduces cell heat without any temperature gradients. The coating also lowers series cell resistance. The coating may be directly deposited on the cell surface or on the undersurface of cover plate bonded to the cell. NASA



## 04 BIOSCIENCES

## 04 BIOSCIENCES

Includes aerospace medicine, exobiology, radiation effects on biological systems; physiological and psychological factors. For related information see also: 05 Biotechnology.

**N74-26619\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### **IMPROVED METHOD OF DETECTING AND COUNTING BACTERIA Patent Application**

Grace L. Picciolo and Emmett W. Chappelle, inventors (to NASA)  
Issued 31 May 1974 20 p  
(NASA-Case-GSC-11917-1; US-Patent-Appl-SN-475337) Avail:  
NTIS HC \$4.00 CSCL 06M

A method for bacteria counting and detection is described. The problems solved by the equipment are identified as: (1) the lack of recognition that a quantity of nonbacterial ATP was bound to large molecules of particulate matter and would not be destroyed by apyrase unless freed, as in this case by a suitable buffer such as malic acid and (2) the sensitivity or lack of capability of a system to detect and count low bacteria levels. The solution was to concentrate the sample, by centrifuging for example, so that the ATP would effectively stand apart from the supernatant phase.

NASA

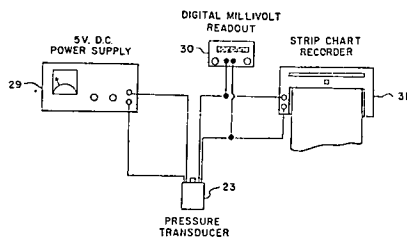
**N74-32518\*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

### **MEASUREMENT OF GAS PRODUCTION OF MICROORGANISMS Patent Application**

Judd R. Wilkins, Stacey M. Mills, and Albin O. Pearson, inventors (to NASA) Filed 24 Jul. 1974 20 p  
(NASA-Case-LAR-11326-1; US-Patent-Appl-SN-491416) Avail:  
NTIS HC \$4.00 CSCL 06M

A simple apparatus and method are disclosed for measuring gas production by microorganisms using a pressure transducer to sense pressure built-up by members of the ENTEROBACTERIACEAE group of bacteria. The test system consists of a 5.0 psid pressure transducer and a pressure equalizer valve attached to the metal cap of a 20 x 150 mm test tube with gas pressure being recorded on a strip chart recorder.

NASA



## 05 BIOTECHNOLOGY

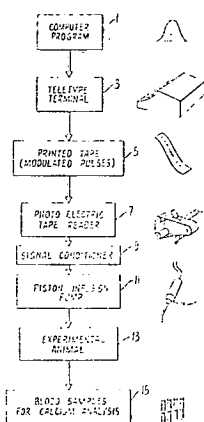
Includes life support systems, human engineering; protective clothing and equipment; crew training and evaluation, and piloting. For related information see also: 04 Biosciences.

**N74-22771\*** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

**PROGRAMMABLE PHYSIOLOGICAL INFUSION Patent**  
Wayne H. Howard, Donald R. Young, and Richard R. Adachi, inventors (to NASA) Issued 7 May 1974 7 p Filed 1 Dec. 1972 Supersedes N73-14092 (11 - 05, p 0503)  
(NASA-Case-ARC-10447-1; US-Patent-3,809,871;  
US-Patent-Appl-SN-311175; US-Patent-Class-235-151.3;  
US-Patent-Class-128-214E) Avail: US Patent Office CSCL 06B

A programmable physiological infusion device and method are provided wherein a program source, such as a paper tape, is used to actuate an infusion pump in accordance with a desired program. The system is particularly applicable for dispensing calcium in a variety of waveforms.

Official Gazette of the U.S. Patent Office



**N74-26625\*** National Aeronautics and Space Administration, Pasadena Office, Calif.

**MINIATURE MULTICHANNEL BIOTELEMETER SYSTEM Patent**

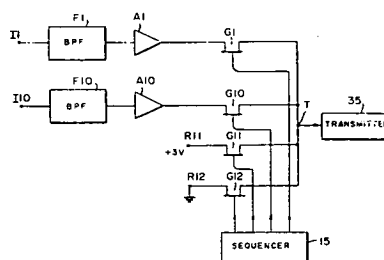
John B. Carraway (JPL) and Joe T. Sumida, inventors (to NASA) (JPL) Issued 4 Jun. 1974 9 p Filed 5 Jul. 1972 Sponsored by NASA

(NASA-Case-NPO-13065-1; US-Patent-3,815,109;  
US-Patent-Appl-SN-269073; US-Patent-Class-340-207R;  
US-Patent-Class-128-2.1A; US-Patent-Class-325-113;  
US-Patent-Class-325-141; US-Patent-Class-340-183;  
US-Patent-Class-340-203) Avail: US Patent Office CSCL 06B

A miniature multichannel biotelemetry system is described. The system includes a transmitter where signals from different sources are sampled to produce a waveform of pulses. The transmitter also separates signals by sync pulses. The pulses

amplitude modulate a radio frequency carrier which is received at a receiver unit. There the sync pulses are detected by a demultiplexer which routes the pulses from each different source to a separate output channel where the pulses are used to reconstruct the signals from the particular source.

Official Gazette of the U.S. Patent Office



**N74-26626\*** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.

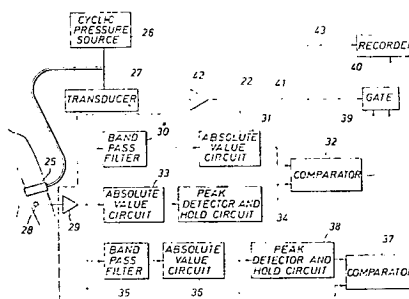
**APPARATUS AND METHOD FOR PROCESSING KOROTKOV SOUNDS Patent**

Donald P. Golden (Technol., Inc., Houston, Tex.), George W. Hoffer (Technol., Inc., Houston, Tex.), and Roger A. Wolthuis, inventors (to NASA) (Technol., Inc., Houston, Tex.) Issued 4 Jun. 1974 9 p Filed 24 May 1972 Sponsored by NASA

(NASA-Case-MSC-13999-1; US-Patent-3,814,083;  
US-Patent-Appl-SN-256317; US-Patent-Class-128-2.05A;  
US-Patent-Class-128-2.05S) Avail: US Patent Office CSCL 06B

A Korotkov sound processor, used in a noninvasive automatic blood measuring system where the brachial artery is occluded by an inflatable cuff, is disclosed. The Korotkov sound associated with the systolic event is determined when the ratio of the absolute value of a voltage signal, representing Korotkov sounds in the range of 18 to 26 Hz to a maximum absolute peak value of the unfiltered signals, first equals or exceeds a value of 0.45. Korotkov sound associated with the diastolic event is determined when a ratio of the voltage signal of the Korotkov sounds in the range of 40 to 60 Hz to the absolute peak value of such signals within a single measurement cycle first falls below a value of 0.17. The processor signals the occurrence of the systolic and diastolic events and these signals can be used to control a recorder to record pressure values for these events.

Official Gazette of the U.S. Patent Office



**N74-27566\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

## ARTERIAL PULSE WAVE PRESSURE TRANSDUCER Patent

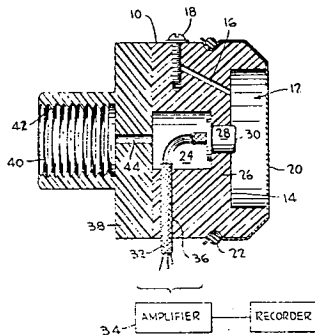
Chung Kim (George Washington Univ., Washington, D. C.), Donald Gorelick (George Washington Univ., Washington, D. C.), and Wayne Chen, inventors (to NASA) (George Washington Univ., Washington, D. C.) Issued 21 May 1974 5 p Filed 25 Sep. 1972 Supersedes N73-11097 (11 - 02, p 0135) Sponsored by NASA

(NASA-Case-GSC-11531-1; US-Patent-3,811,429;

US-Patent-Appl-SN-291845; US-Patent-Class-128-2.05E;

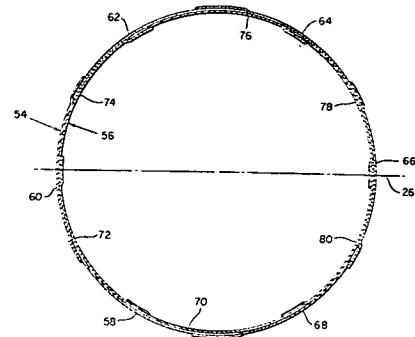
US-Patent-Class-73-398AR) Avail: US Patent Office CSCL 06B

An arterial pulse wave pressure transducer is introduced. The transducer is comprised of a fluid filled cavity having a flexible membrane disposed over the cavity and adapted to be placed on the skin over an artery. An arterial pulse wave creates pressure pulses in the fluid which are transduced, by a pressure sensitive transistor in direct contact with the fluid, into an electric signal. The electrical signal is representative of the pulse waves and can be recorded so as to monitor changes in the elasticity of the arterial walls. Official Gazette of the U.S. Patent Office



joint convolution, is unrestrained other than being retained in the flexure plane. A compression ring is secured at the major diameter, at certain of the convolutions, preferably alternate ones. A pair of axially disposed cable joint restraints at the convolution periphery are disposed in a plane normal to the flexure plane.

Official Gazette of the U.S. Patent Office

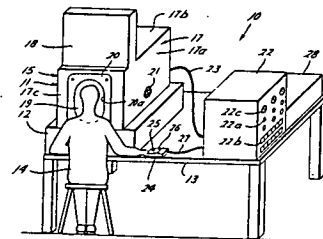


**N74-32549\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**MULTIPARAMETER VISION TESTER Patent Application** Stacey R. Hunt (GE), Robert J. Homkes (GE), Wilmer B. Poteate (GE), and Andrew C. Sturges, inventors (to NASA) (GE) Filed 10 Sep. 1973 72 p (Contract NASw-1630)

(NASA-Case-MSC-13601-2; US-Patent-Appl-SN-395495) Avail: NTIS HC \$6.75 CSCL 06B

A compact optical vision testing unit is reported for testing a relatively large number of physiological characteristics of the eyes and visual system of a human subject. The tester can be used in a number of civilian and industrial applications to provide several complex optical tests having conflicting position and movement requirements in a single compact and integrated unit. The various optical assemblies and devices located within the unit are provided with automatic control mechanisms which may be readily controlled by a programmed computer. NASA



**N74-32546\*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

## FLEXIBLE JOINT FOR PRESSURIZABLE GARMENT Patent

William Elkins (Garrett Corp., Los Angeles), Eugene W. Connell (Garrett Corp., Los Angeles), and Robert E. Alesna, inventors (to NASA) (Garrett Corp., Los Angeles) Issued 3 Sep. 1974 10 p Sponsored by NASA

(NASA-Case-MSC-110/72; US-Patent-3,832,735;

US-Patent-Appl-SN-689455; US-Patent-Class-2-2.1A;

US-Patent-Class-2-82; US-Patent-Class-156-218) Avail: US Patent Office CSCL 06Q

A flexible joint for a pressurizable garment is described which has two fabric layers bonded together. The lay of one layer is straight cut and the other of bias cut. A ring-like tension member covered with Teflon disposed at the minor diameter of each

**N74-32552\*#** National Aeronautics and Space Administration.  
Pasadena Office, Calif.

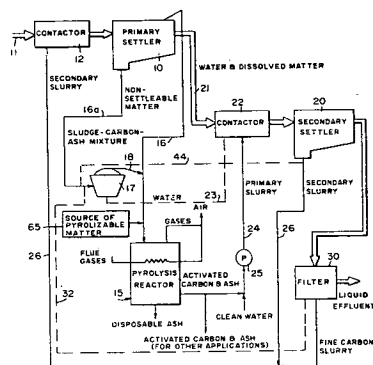
**RAW LIQUID WASTE TREATMENT SYSTEM AND PROCESS**  
**Patent Application**

Marshall F. Humphrey, inventor (to NASA) (JPL) Filed 27 Aug.  
1974 33 p

(Contract NAS7-100)

(NASA-Case-NPO-13573-1; US-Patent-Appl-SN-501014) Avail:  
NTIS HC \$4.75 CSCL 06I

A raw sewage treatment process is disclosed in which substantially all the non-dissolved matter, suspended in the sewage water is first separated from the water, in which at least organic matter remains dissolved. The non-dissolved material is pyrolyzed to form an activated carbon and ash material without the addition of any conditioning agents. The activated carbon and ash material is added to the water from which the non-dissolved matter was removed. The activated carbon and ash material adsorbs the organic matter dissolved in the water and is thereafter supplied in a counter flow direction and combined with the incoming raw sewage to at least facilitate the separation of the non-dissolved settleable materials from the sewage water. Carbon and ash material together with the non-dissolved matter which was separated from the sewage water are pyrolyzed to form the activated carbon and ash material. Author





## 06 CHEMISTRY

Includes chemical analysis and identification (e.g. spectroscopy). For applications see: 17 Materials, Metallic; 18 Materials, Nonmetallic; and 27 Propellants.

**N74-29479\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**ETHER-LINKED ARYL TETRACARBOXYLIC DIANHYDRIDES Patent Application**

James A. Webster, inventor (to NASA) (Monsanto Res. Corp., Dayton, Ohio) Issued 16 Jul. 1974 17 p Sponsored by NASA

(NASA-Case-MFS-22356-1; US-Patent-Appl-SN-489008) Avail: NTIS HC \$4.00 CSCL 07C

Dianhydrides were found which when reacted with diamines provide polyimides that exhibit good tensile strength, and excellent thermal, oxidative, and hydrolytic stability. These characteristics make the polyimides useful as sealants in advanced aerospace structures. A formula for the dianhydrides is given and a method for their preparation is presented. NASA

**N74-29480\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**POLYIMIDES OF ETHER-LINKED ARYL TETRACARBOXYLIC DIANHYDRIDES Patent Application**

James A. Webster, inventor (to NASA) (Monsanto Res. Corp.) Issued 11 Jul. 1974 19 p Sponsored by NASA

(NASA-Case-MFS-22355; US-Patent-Appl-SN-487852) Avail: NTIS HC \$4.00 CSCL 07C

Polyimides with chemical and physical properties that make them useful as sealants in advanced aerospace structures and a procedure for their preparation are presented. The polyimides also have high levels of thermal, oxidative, and hydrolytic stability. NASA

**N74-30502\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**PRODUCTION OF PURE METALS Patent**

Warren H. Philipp, Stanley J. Marsik, and Charles E. May, inventors (to NASA) Issued 30 Jul. 1974 4 p Filed 18 Apr. 1972 Supersedes N72-25164 (10 - 16, p 2119) Continuation-in-part of US Patent Appl. SN-876588, filed 13 Nov. 1969

(NASA-Case-LEW-10906-1; US-Patent-3,826,726; US-Patent-Appl-SN-245279; US-Patent-Class-204-157.1H; US-Patent-Appl-SN-876588) Avail: US Patent Office CSCL 07D

A process for depositing elements by irradiating liquids is reported. Ultra pure elements are precipitated from aqueous solutions or suspensions of compounds. A solution of a salt of a metal to be prepared is irradiated, and the insoluble reaction product settles out. Some chemical compounds may also be prepared in this manner.

Official Gazette of the U.S. Patent Office

**N74-34579\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CATALYTIC TRIMERIZATION OF AROMATIC NITRILES AND TRIARYL-S-TRIAZINE RING CROSS-LINKED HIGH TEMPERATURE RESISTANT POLYMERS AND COPOLYMERS MADE THEREBY Patent Application**

Li-Chen Hsu, inventor (to NASA) Filed 10 Oct. 1974 45 p (NASA-Case-LEW-12053-1; US-Patent-Appl-SN-513613) Avail: NTIS HC \$5.25 CSCL 07C

Aromatic nitrile compounds, aromatic nitrile-modified (terminated and/or appended) imide, benzimidazole, imidazopyrrolone, and quinoxaline prepolymers, and aromatic dinitrile compounds were trimerized by heating to a temperature in the range of from about 100 C to about 700 C, and preferably in the range of from about 200 C to about 350 C, in the presence of a catalyst or mixture of catalysts selected from one or more of the following groups: (1) organic sulfonic and sulfinic acids; (2) organic phosphonic and phosphinic acids; and (3) metallic acetylacetonates. The process occurs at a pressure range of from about atmospheric pressure to about 10,000 p.s.i., and preferably in the range of from about 200 p.s.i. to about 750 p.s.i. The catalytic trimerization process is carried out in the presence of reinforcing filler material. The particular catalysts, moderate temperatures, and pressures employed in the trimerization process, and the processable filler-reinforced composites and polymers produced thereby, exhibit good thermal-oxidative stability and high performance structural properties at elevated temperatures. Author

## 07 COMMUNICATIONS

Includes communications equipment and techniques; noise; radio and communications blackout; modulation telemetry; tracking radar and optical observation; and wave propagation. For basic research see: 23 Physics, General; and 21 Navigation.

**N74-22814\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

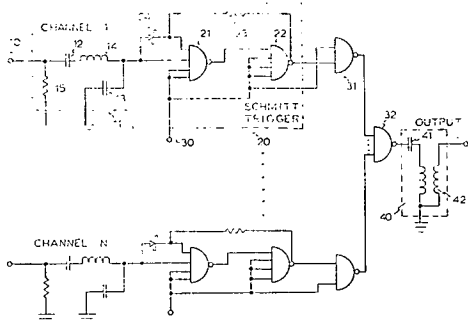
### HIGH ISOLATION RF SIGNAL SELECTION SWITCHES Patent

Michael F. Hanna (JPL) and Harry K. Detweiler, inventors (to NASA) (JPL) Issued 30 Apr. 1974 6 p Filed 27 Mar. 1973 Supersedes N73-23106 (11 - 14, p 1618) Sponsored by NASA

(NASA-Case-NPO-13081-1; US-Patent-3,808,464; US-Patent-Appl-SN-345372; US-Patent-Class-307-243; US-Patent-Class-307-215; US-Patent-Class-307-290; US-Patent-Class-328-154) Avail: US Patent Office CSCL 17B

A selection switch with high isolation between RF signal input terminals is achieved with a gated Schmitt trigger circuit feeding into a control NAND gate in each signal switching channel. The control NAND gates of the separate signal channels are coupled to an output terminal by a single NAND gate. The Schmitt trigger circuits and all gates are implemented with Schottky transistor-transistor logic circuits having input clamping diodes. Each Schmitt trigger circuit includes two cascaded NAND gates and a feedback isolation Schottky diode between one input terminal connected to receive an RF input and another input terminal connected to receive a feedback signal from the second of the two cascaded NAND gates. Both NAND gates of the Schmitt trigger circuits are enabled by the same switch control signal which enables the control gates.

Official Gazette of the U.S. Patent Office



**N74-22827\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### POLARIZATION COMPENSATOR FOR OPTICAL COMMUNICATIONS Patent Application

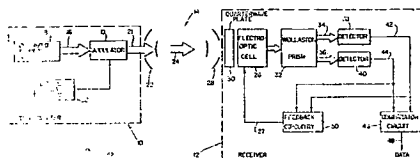
Michael W. Fitzmaurice and James B. Abshire, inventors (to

NASA) Filed 24 Apr. 1974 23 p

(NASA-Case-GSC-11782-1; US-Patent-Appl-SN-463925) Avail: NTIS HC \$4.25 CSCL 17B

An optical data communication system is reported whereby two orthogonal polarization states of a light beam carrier correspond to digital states. In such a system, automatic polarization compensation is provided by applying a dither modulating voltage to a cell exhibiting the electrooptic effect. The cell controls the relative phase of electric field components of an input light beam enabling the dither frequency component of the difference of the instantaneous powers in the two polarization states to be coherently detected. A signal derived from the coherent detection process is fed back to the cell via an integrator to form a polarization bias compensating, servo loop.

NASA



**N74-26654\*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

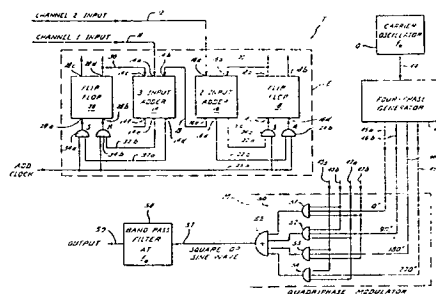
### DIFFERENTIAL PHASE SHIFT KEYED COMMUNICATION SYSTEM Patent

Philip M. Hopkins (Lockheed Electron. Co., Houston, Tex.) and Wally M. Wallingford, inventors (to NASA) (Lockheed Electron. Co., Houston, Tex.) Issued 11 Jun. 1974 10 p Filed 12 Oct. 1972 Sponsored by NASA

(NASA-Case-MSC-14065-1; US-Patent-3,816,657; US-Patent-Appl-SN-297128; US-Patent-Class-178-67; US-Patent-Class-325-30) Avail: US Patent Office CSCL 17B

A communication system using differential phase-shift-keying (DPSK) transmits and receives binary data without requiring timing or phase reference signals. The system encodes and modulates the data at the transmitter, and decodes and demodulates the data at the receiver, without ambiguity as to the data content.

Official Gazette of the U.S. Patent Office



## 07 COMMUNICATIONS

**N74-27612\*** National Aeronautics and Space Administration.  
Lyndon B. Johnson Space Center, Houston, Tex.

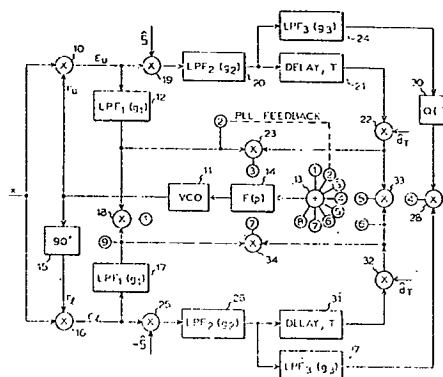
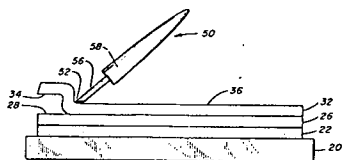
**TECHNIQUE FOR RECOVERY OF VOICE DATA FROM HEAT  
DAMAGED MAGNETIC TAPE Patent**

Joe F. Melugin and David E. OBrien, III, inventors (to NASA)  
 Issued 25 Jun. 1974 5 p Filed 16 Jan. 1973 Supersedes  
 N73-16132 (11 - 07, p 0755)

(NASA-Case-MSC-14219-1; US-Patent-3,819,440;  
US-Patent-Appl-SN-324029; US-Patent-Class-156-94;  
US-Patent-Class-117-2R; US-Patent-Class-179-100.2A;  
US-Patent-Class-179-100.2B; US-Patent-Class-264-36) Avail:  
US Patent Office CSDL 14C

A method for conditioning, and thus enabling retrieval of intelligence from, magnetic tapes after damage from heat has caused the tape to wrinkle and curl severely thereby reducing tape width to less than one-half its original size. The damaged tape is superposed on a first piece of splicing tape with the oxide side of the magnetic tape in contact with the adhesive side of the splicing tape and then carefully smoothed by a special tool. A second piece of splicing tape is placed on the backing side of the magnetic tape then the resulting tape stack is trimmed to the original width of the magnetic tape. After the first piece of splicing tape is carefully removed from the oxide side of the damaged magnetic tape, the resulting magnetic tape is then ready to be placed into a recorder for playback.

Official Gazette of the U.S. Patent Office



**N74-30524\*** National Aeronautics and Space Administration.  
Lyndon B. Johnson Space Center, Houston, Tex.

# DIGITAL COMMUNICATION SYSTEM Patent

Leo G. Monford, Jr., inventor (to NASA) Issued 6 Aug. 1974  
10 p Filed 28 Nov. 1972 Supersedes N73-12151 (11 - 03,  
p 0266)

(NASA-Case-MSC-13912-1; US-Patent-3,828,137;  
US-Patent-Appl-SN-310034; US-Patent-Class-179-15AT;  
US-Patent-Class-179-15BY) Avail: US Patent Office CSCI  
17B

A digital communication system is reported for parallel operation of 16 or more transceiver units with the use of only four interconnecting wires. A remote synchronization circuit produces unit address control words sequentially in data frames of 16 words. Means are provided in each transceiver unit to decode calling signals and to transmit calling and data signals. The transceivers communicate with each other over one data line. The synchronization unit communicates the address control information to the transceiver units over an address line and further provides the timing information over a clock line. A reference voltage level or ground line completes the interconnecting four wire hookup. Official Gazette of the U.S. Patent Office

**N74-30523\*** National Aeronautics and Space Administration.  
Pasadena Office, Calif.

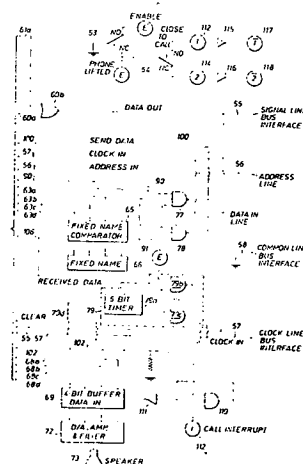
# COHERENT RECEIVER EMPLOYING NONLINEAR COHERENCE DETECTION FOR CARRIER TRACKING Patent

William C. Lindsey and Marvin K. Simon, inventors (to NASA)  
Issued 6 Aug. 1974 12 p Filed 10 May 1973 Supersedes  
N73-23118 (11 - 14, p 1620) Sponsored by NASA

(NASA-Case-NPO-11921-1; US-Patent-3,828,138;  
US-Patent-Appl-SN-359039; US-Patent-Class-179-15BC;  
US-Patent-Class-325-346) Avail: US Patent Office CSCL  
17B

The concept of nonlinear coherence employed in carrier tracking to improve telecommunications efficiency is disclosed. A generic tracking loop for a coherent receiver is shown having seven principle feedback signals which may be selectively added and applied to a voltage controlled oscillator to produce a reference signal that is phase coherent with a received carrier. An eighth feedback signal whose nonrandom components are coherent with the phase detected and filtered carrier may also be added to exploit the sideband power of the received signal. A ninth feedback signal whose nonrandom components are also coherent with the quadrature phase detected and filtered carrier could be additionally or alternatively included in the composite feedback signal to the voltage controlled oscillator.

Official Gazette of the U.S. Patent Office



**N74-30532\*#** National Aeronautics and Space Administration.  
Goddard Space Flight Center, Greenbelt, Md.

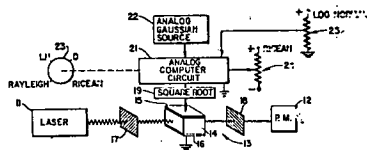
**APPARATUS FOR SIMULATING OPTICAL TRANSMISSION LINKS** Patent Application

M. W. Fitzmaurice and Mona Tycz, inventors (to NASA) Filed  
25 Jun. 1974 20 p  
(NASA-Case-GSC-11877-1; US-Patent-Appl-SN-482953) Avail:  
NTIS HC \$4.00 CSCL 17B

A space-to-space or space-to-earth optical transmission link is simulated by positioning a linear optical modulator between an optical carrier source and a receiver for the carrier. The optical modulator is driven by an analog signal having random variations indicative of characteristics of the transmission link, as derived from an analog computer circuit. The analog computer circuit is responsive to a Gaussian random analog source. For certain types of links, the analog computer circuit is responsive to a pair of Gaussian analog signals which are derived by feeding a relatively wide band Gaussian analog source in parallel to a first low pass filter and to a heterodyne circuit. For space-to-space transmission, transmitter pointing jitter is a dominant noise source and is simulated by deriving a beta statistical variation from the analog computer.

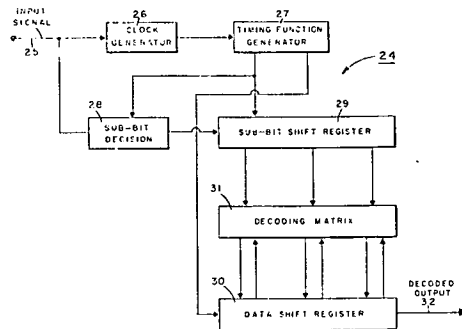
NASA

**NASA**



sub-bit stream. The received sub-bits are processed by a sub-bit decision circuit, entered into a sub-bit shift register, decoded by a decision circuit, entered into a data shift register, and updated to reduce data errors. The bit decision circuit utilizes stored sub-bits and stored data bits to determine subsequent data-bits. Data errors are reduced by using at least one up-date circuit.

Official Gazette of the U.S. Patent Office



**N74-32598\*** National Aeronautics and Space Administration.  
Lyndon B. Johnson Space Center, Houston, Tex.

**METHOD AND APPARATUS FOR DECODING COMPATIBLE CONVOLUTIONAL CODES** Patent

George D. Doland, inventor (to NASA) (Lockheed Electron. Co., Houston, Tex.) Issued 20 Aug. 1974 9 p Filed 28 Jun. 1972 Supersedes N72-27178 (10 - 18, p 2395) Sponsored by NASA

by NASA  
(NASA-Case-MSC-14070-1; US-Patent-3,831,142;  
US-Patent-AppI-SN-266940; US-Patent-Class-340-146.1AQ)  
Avail: US Patent Office CSCL 17B

This invention relates to learning decoders for decoding compatible convolutional codes. The decoder decodes signals which have been encoded by a convolutional coder and allows performance near the theoretical limit of performance for coded data systems. The decoder includes a sub-bit shift register wherein the received sub-bits are entered after regeneration and shifted in synchronization with a clock signal recovered from the received

**N74-32601\*#** National Aeronautics and Space Administration.  
Lyndon B. Johnson Space Center, Houston, Tex.

**FIELD SEQUENTIAL STEREO TELEVISION Patent Application**

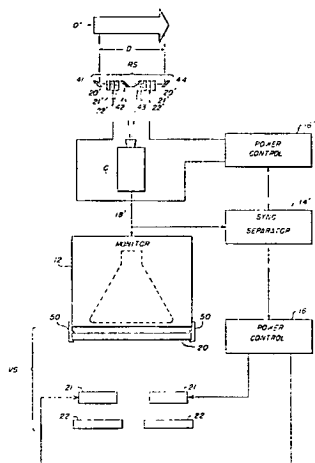
William E. Perry, inventor (to NASA) Filed 31 Jul. 1974  
24 p  
(NASA-Case-MSC-12616-1; US-Patent-Appl-SN-493360) Avail:  
NTIS HC \$4.25 CSCL 09F

A stereoscopic image reproduction system for providing, in rapid sequence, alternating right and left stereoscopic images of an object and presenting such images on the same display device is disclosed. The user observes images on the display device through a solid state electro-optic shuttering device synchronized to the alternating stereoscopic images to permit light transmission to the right eye only when the right stereo image is on the display device and to the left eye only when the left stereo image is on the display device. A particular embodiment

## 07 COMMUNICATIONS

disclosed employs a two-camera television system with a field sequential multiplexer to provide the alternating images on a television screen. Another television embodiment uses a second solid state electro-optic shuttering device in conjunction with a single camera and range finder type optics to provide the alternating image signal. NASA

**NASA**



## 08 COMPUTERS

Includes computer operation and programming; and data processing. For applications, see specific categories. For related information see also: 19 Mathematics.

**N74-30649\***# National Aeronautics and Space Administration. Pasadena Office, Calif.

### COMPUTER INTERFACE SYSTEM Patent Application

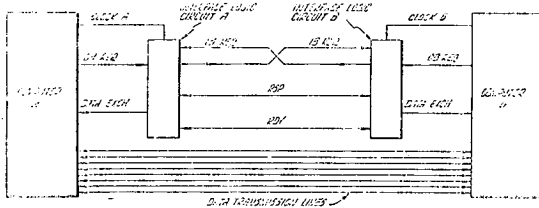
Filed 5 Aug. 1974 26 p

(Contract NAS7-100)

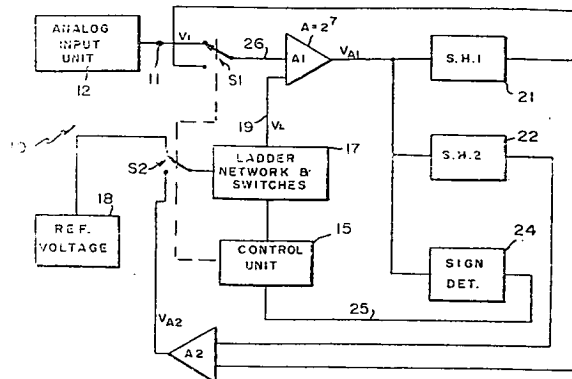
(NASA-Case-NPO-13428-1; NASA-Case-NPO-13447-1;

US-Patent-Appl-SN-495022) Avail: NTIS HC \$4.50 CSCL 09B

An interface logic circuit permitting the transfer of information between two computers having asynchronous clocks is disclosed. The information transfer involves utilization of control signals (including request, return-response, ready) to generate properly timed data strobe signals. Noise problems are avoided because each control signal, upon receipt, is verified by at least two clock pulses at the receiving computer. If control signals are verified, a data strobe pulse is generated to accomplish a data transfer. Once initiated the data strobe signal is properly completed independently of signal disturbances in the control signal initiating the data strobe signal. Completion of the data strobe signal is announced by automatic turn-off of a return-response control signal. NASA



with a 7-bit up-down counter is used. During the first conversion step which is a coarse conversion, the input,  $V_{sub I}$ , is compared with the DAC output,  $V_{sub L}$  and the 7-bits of the counter are set by successive approximation. Thereafter, after settling, the DAC output is driven twice toward  $V_{sub I}$ . The output of an amplifier of a gain 2 to the 7th power is stored after each change of the DAC in one of two storage and hold circuits, depending on the polarity of the amplifier output. Then, the content of the 7-bit counter is transferred to the 7 higher order bits of a 14-bit buffer counter. The fine conversion step is performed by successive approximation. NASA



**N74-32648\***# National Aeronautics and Space Administration. Pasadena Office, Calif.

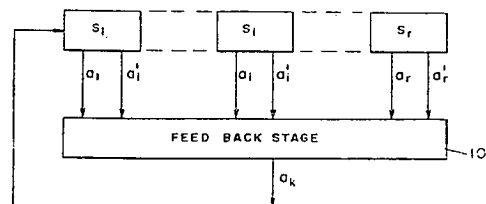
### NONLINEAR NONSINGULAR FEEDBACK SHIFT REGISTERS Patent Application

Marvin Perlman, inventor (to NASA) (JPL) Filed 27 Aug. 1974 40 p

(Contract NAS7-100)

(NASA-Case-NPO-13451-1; US-Patent-Appl-SN-501012) Avail: NTIS HC \$5.00 CSCL 09B

Four classes of nonlinear nonsingular feedback shift registers (NLFSR) are disclosed. Each NLFSR, assumed to be  $r$  stages long, regardless of its class, generates a feedback sequence of length  $2r$  is known. Each NLFSR of either class 1 or class 2 has a feedback arrangement which is a function of primitive polynomial of degree  $r-1$ . Each register of class 1 includes three nonlinear terms, each one of which is the AND function of a different combination of  $(r-1)$  outputs of the first  $(r-1)$  stages. Each register of class 2 includes a single nonlinear term which is the AND function of  $(r-1)$  outputs of the first  $(r-1)$  stages. Each NLFSR in class 3 has a feedback arrangement which is based on a primitive polynomial of degree  $r-2$  and a unique single nonlinear term, while each NLFSR in class 4 has a feedback arrangement which is based on a primitive polynomial of degree  $r-3$  and three nonlinear terms. NASA



**N74-32648\***# National Aeronautics and Space Administration. Pasadena Office, Calif.

### ANALOG TO DIGITAL CONVERTER Patent Application

Charles H. Lucas, inventor (to NASA) (JPL) Filed 27 Aug. 1974 25 p

(Contract NAS7-100)

(NASA-Case-NPO-13385-1; US-Patent-Appl-SN-501011) Avail: NTIS HC \$4.25 CSCL 09B

An analog-to-digital converters, finding particular application in a multichannel pulse height analyzer, with a means for digitizing the analog input in two conversion steps is presented. To digitize the input to 13 bits, a 7-bit digital to analog converter (DAC)

## 09 ELECTRONIC EQUIPMENT

Includes electronic test equipment and maintainability; component parts, e.g., electron tubes, tunnel diodes, transistors; integrated circuitry; microminiaturization. For basic research see: 10 Electronics. For related information see also: 07 Communications and 21 Navigation.

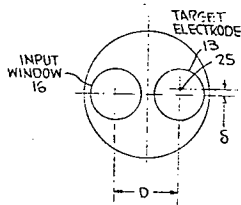
**N74-21850\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### IMAGE TUBE Patent

Kenneth L. Hallam (Bendix Res. Labs.) and Charles Bruce Johnson, inventors (to NASA) (Bendix Res. Labs.) Issued 23 Apr. 1974 6 p Filed 16 Oct. 1972 Supersedes N73-13214 (11 - 04, p 0395) Sponsored by NASA (NASA-Case-GSC-11602-1; US-Patent-3,806,756; US-Patent-Appl-SN-298157; US-Patent-Class-315-10; US-Patent-Class-315-11; US-Patent-Class-315-12) Avail: US Patent Office CSCL 09E

An optical image is projected onto a planar surface of a photocathode that derives an electron beam replica of the image. A target electrode displaced relative to the photocathode so that it does not obstruct the optical image includes a planar surface for receiving and deriving an accurate replica of the electron beam image. The two planar surfaces are parallel. The electron beam image is focused on the target electrode by providing throughout a region that extends between the planar surfaces of the photocathode and receiving electrode, constant homogeneous dc electric and magnetic fields. The electric field extends in a direction perpendicular to the planar surfaces while the magnetic field extends along a straight line that intersects the photocathode and target electrode at an acute angle.

Official Gazette of the U.S. Patent Office



**N74-21851\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### BIO-ISOLATED dc OPERATIONAL AMPLIFIER Patent

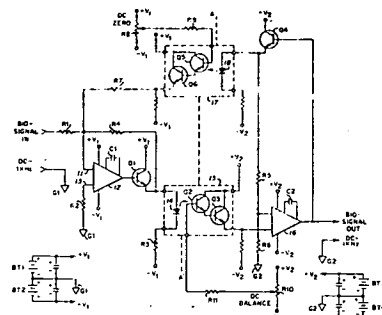
Robert D. Lee, inventor (to NASA) Issued 14 May 1974 4 p Filed 30 Jun. 1972 Supersedes N72-27233 (10 - 18, p 2402)

(NASA-Case-ARC-10596-1; US-Patent-3,811,094; US-Patent-Appl-SN-267862; US-Patent-Class-330-59; US-Patent-Class-330-28) Avail: US Patent Office CSCL 09E

A bio-isolated dc operational amplifier is described for use in making bioelectrical measurements of a patient while providing isolation of the patient from electrical shocks. The circuit contains a first operational amplifier coupled to the patient with its output coupled in a forward loop through a first optic coupler to a second operational amplifier. The output of the second operational

amplifier is coupled to suitable monitoring circuitry via a feedback circuit including a second optic coupler to the input of the first operational amplifier.

Official Gazette of the U.S. Patent Office



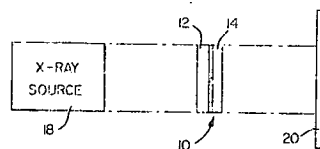
**N74-21858\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### METHOD OF DETERMINING BOND QUALITY OF POWER TRANSISTORS ATTACHED TO BED SUBSTRATES Patent Applications

Thomas A. Telfer, inventor (to NASA) (GE) Filed 26 Apr. 1974 11 p Sponsored by NASA

(NASA-Case-MFS-21931-1; US-Patent-Appl-SN-464721) Avail: NTIS HC \$4.00 CSCL 09A

A non destructive method is reported for testing the bond quality of transistor heat sink bonds by X-ray examination of the bond. The bond is X-ray photographed and the photograph is subjected to analysis by a light meter system to determine the percentage of voids in the bond. Void areas approaching 20% of the bond area can be tolerated if they are scattered. For repeatable results, X-ray of identical assemblies must be taken at identical machine settings. Since it is possible for lack of bonding not to show on an X-ray if the molten preform has conformed exactly to the bottom of the chip, the zing test for wetting should be used in conjunction with the X-ray test. NASA



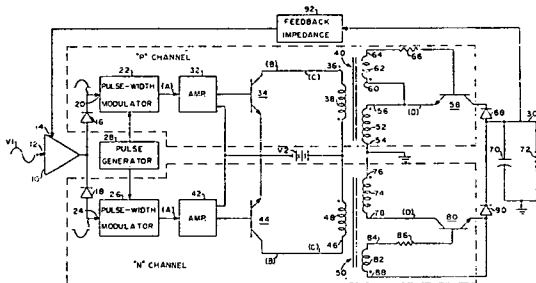
**N74-21859\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### ISOLATED OUTPUT SYSTEM FOR A CLASS D SWITCHING-MODE AMPLIFIER Patent Application

Marial A. Honnell, inventor (to NASA) (Auburn Univ.) Filed

26 Apr. 1974 15 p Sponsored by NASA  
(NASA-Case-MFS-21616-1; US-Patent-Appl-SN-464723) Avail:  
NTIS HC \$4.00 CSCL 09E

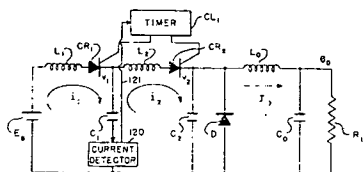
A Class D amplifier is reported for the amplification of signals having uni-polar or bi-polar direct current, or alternating current. The device contains positive and negative signal channels and includes a transformer coupled output circuit for each channel with a switching circuit which effects isolation of the non-operating channel from the operating channel as a function of signal polarity. NASA



**N74-22864\*** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

**LOAD INSENSITIVE ELECTRICAL DEVICE Patent**  
Francisc C. Schwarz, inventor (to NASA) Issued 30 Apr. 1974  
15 p Filed 6 Nov. 1970 Supersedes N72-21251 (10 - 12,  
p 1587) Continuation-in-part of US Patent Appl. SN-810579,  
filed 26 Mar. 1969  
(NASA-Case-XER-11046-2; US-Patent-3,808,511;  
US-Patent-Appl-SN-87597; US-Patent-Class-321-45R;  
US-Patent-Appl-SN-810579) Avail: US Patent Office CSCL  
09A

A class of power converters is described for supplying direct current at one voltage from a source at another voltage. It includes a simple passive circuit arrangement of solid-state switches, inductors, and capacitors by which the output voltage of the converter tends to remain constant in spite of changes in load. The switches are sensitive to the current flowing in the circuit and are employed to permit the charging of capacitance devices in accordance with the load requirements. Because solid-state switches (such as SCR's) may be used with relatively high voltage and because of the inherent efficiency of the invention that permits relatively high switching frequencies, power supplies built in accordance with the invention, together with their associated cabling, can be substantially lighter in weight for a given output power level and efficiency of operation than systems of the prior art. Official Gazette of the U.S. Patent Office



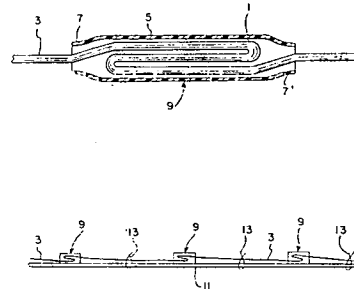
**N74-22865\*** National Aeronautics and Space Administration.  
Langley Research Center, Langley Station, Va.

**MEANS FOR ACCOMMODATING LARGE OVERSTRAIN IN LEAD WIRES Patent**

Carl V. Rumble (Modern Machine and Tool Co.) and Kendall L. Driscoll, inventors (to NASA) (Modern Machine and Tool Co.)  
Issued 7 May 1974 4 p Filed 25 Apr. 1973 Supersedes  
N73-22151 (11 - 13, p 1499) Sponsored by NASA  
(NASA-Case-LAR-10168-1; US-Patent-3,809,800;  
US-Patent-Appl-SN-354407; US-Patent-Class-174-70R;  
US-Patent-Class-174-69; US-Patent-Class-174-DIG.8;  
US-Patent-Class-244-151R) Avail: US Patent Office CSCL  
09A

An electrical wire is reported along whose length loops are formed at intervals and retained in a plastic capsule that allows unfolding of the loop when tension is exerted on the opposite ends of the wire. The capsule is formed by encompassing each loop with a sleeve of heat shrinkable synthetic plastic material which overlaps the loop and heat shrinking the overlapping portions. Thus, a length of electrical wire is formed which stores extra lengths of wire in the quantity needed to match the expected stretching of materials or elements such as ropes, cords and the like of high elongation to which the electrical wire may be attached.

Official Gazette of the U.S. Patent Office



**N74-22873\*#** National Aeronautics and Space Administration.  
Goddard Space Flight Center, Greenbelt, Md.

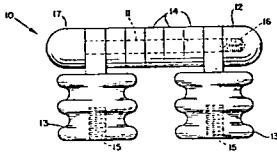
**HIGH VOLTAGE DISTRIBUTOR Patent Application**  
James F. McChesney, Jr., inventor (to NASA) Filed 15 May  
1974 10 p  
(NASA-Case-GSC-11849-1; US-Patent-Appl-SN-470428) Avail:  
NTIS HC \$4.00 CSCL 09A

A high voltage distributor is described which allows the connection and disconnection of a high voltage power supply to and from one or more circuits requiring the supply. The design configuration features unrestrained pump-out, insulation of the high voltage from ground, and freedom from corona. These features are obtained by mounting a removable retaining rod on one or more insulators, thereby facilitating the support by retaining rod of a plurality of washers. One of the washers is integrally connected



## 09 ELECTRONIC EQUIPMENT

to the high voltage power supply while the remaining washers are integrally connected to the circuits requiring the high voltage.  
NASA



**RAPIDLY REDUCING THE SENSITIVITY THEREOF** Patent James O. McClenahan, inventor (to NASA) Issued 28 Jun. 1974 4 p Filed 28 Nov. 1972 Supersedes N73-30187 (11 - 21, p 2517)

(NASA-Case-ARC-10593-1; US-Patent-3,821,546; US-Patent-Appl-SN-310193; US-Patent-Class-250-207; US-Patent-Class-307-252L; US-Patent-Class-307-252Q) Avail: US Patent Office CSCL 09A

A simple, reliable and inexpensive control circuit is described for rapidly reducing the bias voltage across one or more of the dynode stages of a photomultiplier, to substantially decrease its sensitivity to incoming light at those times where excess light intensity might damage the tube. The control circuit comprises a switching device, such as a silicon controlled rectifier (SCR), coupled between a pair of the electrodes in the tube, preferably the cathode and first dynode, or the first and second dynodes, the switching device operating in response to a trigger pulse applied to its gate to short circuit the two electrodes. To insure the desired reduction in sensitivity, two switching stages, the devices being operated simultaneously to short circuit both stages.  
Official Gazette of the U.S. Patent Office

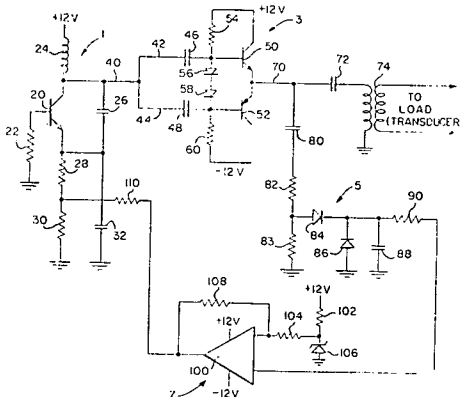
**N74-26732\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**LC-OSCILLATOR WITH AUTOMATIC STABILIZED AMPLITUDE VIA BIAS CURRENT CONTROL** Patent

John F. Hamlet, inventor (to NASA) Issued 4 Jun. 1974 6 p Filed 15 Jun. 1973 Supersedes N73-26196 (11 - 17, p 2003)

(NASA-Case-MFS-21698-1; US-Patent-3,815,048; US-Patent-Appl-SN-37050; US-Patent-Class-331-109; US-Patent-Class-331-117R; US-Patent-Class-331-183) Avail: US Patent Office CSCL 09A

A stable excitation supply for measurement transducers is described. It consists of a single-transistor oscillator with a coil connected to the collector and a capacitor connected from the collector to the emitter. The output of the oscillator is rectified and the rectified signal acts as one input to a differential amplifier; the other input being a reference potential. The output of the amplifier is connected at a point between the emitter of the transistor and ground. When the rectified signal is greater than the reference signal, the differential amplifier produces a signal of polarity to reduce bias current and, consequently, amplification.  
Official Gazette of the U.S. Patent Office



**N74-27683\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

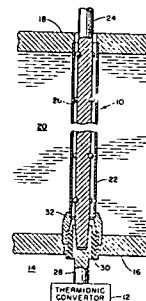
**HIGH CURRENT ELECTRICAL LEAD** Patent

Warner B. Kaufman and Roland Breitwieser, inventors (to NASA) Issued 28 Jun. 1974 4 p Filed 19 Jul. 1972 Supersedes N72-31239 (10 - 22, p 2939)

(NASA-Case-LEW-10950-1; US-Patent-3,821,462; US-Patent-Appl-SN-273222; US-Patent-Class-174-15C; US-Patent-Class-174-28; US-Patent-Class-174-111; US-Patent-Class-310-4R) Avail: US Patent Office CSCL 09E

An electrical lead has insulators imbedded in an inner conductor rod to form an annulus between the rod and a surrounding outer sheath. This annular space is filled with gas which conducts heat and prevents electrical leakage.

Official Gazette of the U.S. Patent Office



**N74-27682\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**PHOTOMULTIPLIER CIRCUIT INCLUDING MEANS FOR**

**N74-27688\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

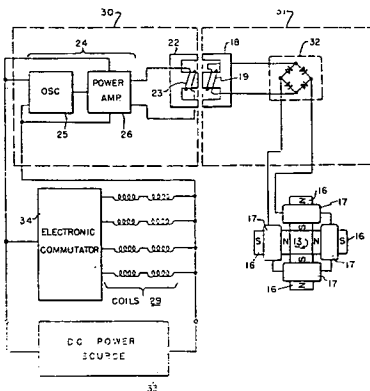
**BRUSHLESS dc MOTOR WITH WOUND ROTOR Patent Application**

Edmund J. Bahm, inventor (to NASA) (JPL) Issued 12 Jun. 1974 14 p

(Contract NAS7-100)

(NASA-Case-NPO-13437-1; US-Patent-Appl-SN-478801) Avail: NTIS HC \$4.00 CSCL 09A

A brushless dc motor is disclosed in which the rotor is an electromagnet energized through a transformer having its primary winding stationary on the stator, and its secondary winding mounted on the rotor. Controlled dc current applied to the motor is converted to ac current for inductive coupling to the rotating secondary winding. The ac current in the secondary winding is rectified to provide dc current to the rotor field coil. NASA



**N74-27690\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

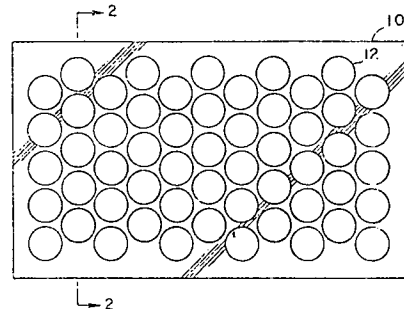
**DICHROIC PLATE Patent Application**

Philip D. Potter, inventor (to NASA) (JPL) Issued 27 Jun. 1974 13 p

(Contract NAS7-100)

(NASA-Case-NPO-13506-1; US-Patent-Appl-SN-483851) Avail: NTIS HC \$4.00 CSCL 09A

A dichroic plate is disclosed for passing radiation within a particular frequency band and reflecting radiation outside of that frequency band. The value of the thickness of the plate is selected so that the plate acts as a resonant narrow band pass filter for the desired pass frequency, and the shapes of the apertures in the dichroic plate are selected to compensate for the phase shift caused by the air plate interface presented to the signals passing therethrough. NASA



**N74-27689\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

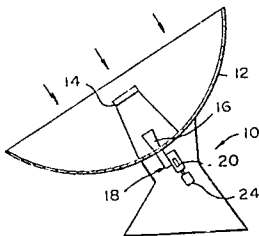
**REFRIGERATED COAXIAL COUPLING Patent Application**

Robert C. Clauss (JPL) and Ervin R. Wiebe, inventors (to NASA) (JPL) Issued 27 Jun. 1974 15 p

(Contract NAS7-100)

(NASA-Case-NPO-13504-1; US-Patent-Appl-SN-483852) Avail: NTIS HC \$4.00 CSCL 09A

A transmission line is reported for improving the sensitivity of a maser or other microwave processing equipment. A cooled coaxial line is used for coupling a waveguide to a refrigerated maser, wherein the central coaxial conductor has an outer end projecting into the waveguide and is covered by a quartz dome. The space between the central and outer conductors of the coaxial line is evacuated to minimize heat transfer. The central coaxial conductor is supported by the outer conductor at only its inner end which is refrigerated to less than 5 deg Kelvin. The central coaxial conductor is a short solid copper rod to maintain even the outer end at a low temperature. NASA



**N74-29556\*** National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

**DIGITAL SERVO CONTROLLER Patent**

Frank Byrne, inventor (to NASA) Issued 30 Jul. 1974 7 p  
Filed 28 Jun. 1973 Supersedes N73-27153 (11 - 18, p 2122)

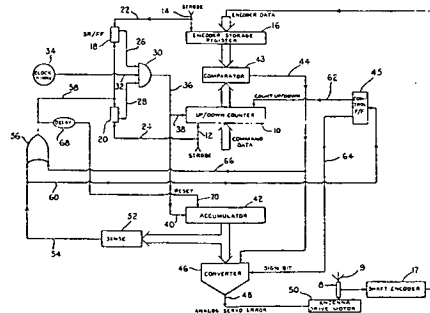
(NASA-Case-KSC-10769-1; US-Patent-3,826,964;

US-Patent-Appl-SN-374583; US-Patent-Class-318-602;

US-Patent-Class-318-603; US-Patent-Class-318-664) Avail: US Patent Office CSCL 09A

A system, for generating a signal to control the rotation of a shaft supporting an antenna so that the antenna is rotated the shortest angular distance from a present angular position to a new desired angular position, was described. The system comprises a shaft encoder which generates a digital encoder signal indicating the present position of the shaft. A command signal is compared with the encoder signal to produce an analog signal for rotating the antenna. An error signal is produced for controlling the direction of rotation of the antenna.

Official Gazette of the U.S. Patent Office



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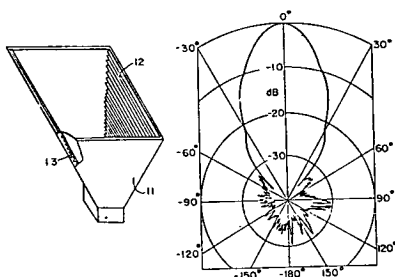
**N74-29575\*#** National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

### **HORN ANTENNA HAVING V-SHAPED CORRUGATED SLOTS Patent Application**

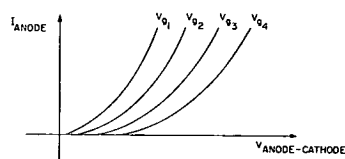
Carl A. Mentzer (Ohio State Univ.) and Leon Peters, Jr., inventors (to NASA) (Ohio State Univ.) Issued 24 Jul. 1974 8 p (Contract NASw-2501)

(NASA-Case-LAR-11112-1; US-Patent-Appl-SN-491419) Avail: NTIS HC \$4.00 CSCL 09E

The development of a corrugated horn antenna in which the corrugated surfaces of the antenna are formed by V-shaped slots was reported. The depth of the slots is between 0.3125 and 0.625 wavelengths. For this range of depths the surface impedance is capacitive and operates in a cut-off mode. The V-shaped corrugated slots are more easily machined than previous slots and the resulting antenna is readily adaptable to unfurlable antennas for space applications. NASA



(1000 C) the barium, etc. is formed at the surface. Anode and grid members are formed using thin films of refractory metal. NASA



**N74-29577\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

### **INTEGRATED STRUCTURE VACUUM TUBE Patent Application**

John Dimeff and William J. Kerwin, inventors (to NASA) Issued 24 Jul. 1974 18 p

(NASA-Case-ARC-10445-1; US-Patent-Appl-SN-491418) Avail: NTIS HC \$4.00 CSCL 09A

High efficiency, multi-dimensional thin film vacuum tubes suitable for use in high temperature, high radiation environments are described. The tubes are fabricated by placing, as by photolithographic techniques, such as are used in solid state integrated circuits, thin film electrode members in selected arrays on facing interior wall surfaces of an alumina substrate envelope. Cathode members are formed using thin films of triple carbonate. The photoresist used in photolithography aids in activation of the cathodes by carbonizing and reacting with the reduced carbonates when heated in vacuum during forming. The finely powdered triple carbonate is mixed with the photoresist used to delineate the cathode locations in the conventional solid state photolithographic manner. Upon high temperature forming

**N74-32660\*** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.

### **MILLIMETER WAVE PUMPED PARAMETRIC AMPLIFIER Patent**

Lawrence E. Dickens, inventor (to NASA) (Westinghouse Elec. Corp., Pittsburgh) Issued 3 Sep. 1974 7 p Filed 2 Oct. 1973 Supersedes N74-10200 (12 -01, p 0026) Sponsored by NASA

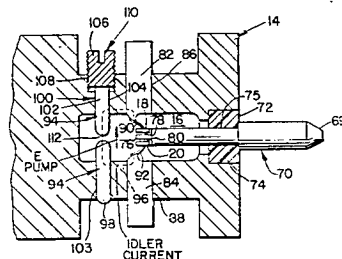
(NASA-Case-GSC-11617-1; US-Patent-3,833,857;

US-Patent-Appl-SN-402865; US-Patent-Class-330-4.9;

US-Patent-Class-330-53) Avail: US Patent Office CSCL 09A

A negative resistance parametric amplifier is reported that employs a discrete varactor diode for high frequency pump excitation in the millimeter wave range.

Official Gazette of the U.S. Patent Office

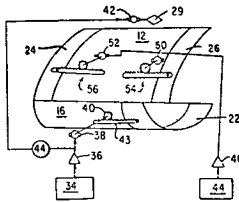


**N74-32674\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**VARIABLE BEAMWIDTH ANTENNA Patent Application**

R. F. Schmidt, inventor (to NASA) Filed 27 Aug. 1974 25 p (NASA-Case-GSC-11862-1; US-Patent-Appl-SN-500979) Avail: NTIS HC \$4.25 CSCL 09E

A double parabolic cylinder antenna is reported that has telescoping sections on the main reflector and sub-reflector to provide continuous bidirectional zooming of a beam. By positioning a monopulse feed within the Airy disc and rotating the feed to compensate for changes in the geometry of the antenna during zooming, bidirectional zooming capability in monopulse radar is achieved. NASA

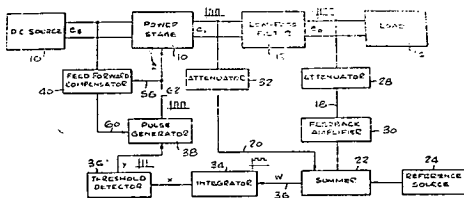


**N74-32675\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**A dc REGULATOR HAVING FEEDFORWARD CONTROL Patent Application**

Gene W. Wester, inventor (to NASA) (JPL) Filed 30 Aug. 1974 14 p (Contract NAS7-100) (NASA-Case-NPO-13481-1; US-Patent-Appl-SN-502139) Avail: NTIS HC \$4.00 CSCL 09E

An improved free-running dc regulator with feedforward control, is disclosed. The feedforward control functions to maintain the frequency of the dc regulator substantially constant by varying the duty ratio in inverse proportion to changes in the source voltage being regulated. NASA



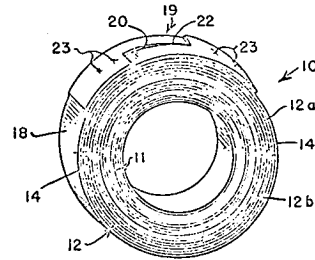
**N74-33738\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**IMPROVED STRUCTURE AND METHOD OF PRODUCING COMPOSITE OF GAPPED AND UNGAPPED CORES Patent**

**Application**

William T. McLyman, inventor (to NASA) (JPL) Filed 13 Sep. 1974 18 p Sponsored by NASA (NASA-Case-NPO-13413-1; US-Patent-Appl-SN-505880) Avail: NTIS HC \$4.00 CSCL 09A

A composite toroidal core having high permeability for small magnetizing current and low permeability for much higher magnetizing current is fabricated by winding two toroidal cores, one to fit inside the other, using a metal ribbon. The outer core is cut through at least one side, and reset with less than a 1 mil gap, after lapping and etching the cut ends, using a sheet of nonmagnetic material to space the gap and a strap around the outer core to hold the cut ends together with the sheet inbetween. Ribbon is then unwound from around the inner core until the inner core just fits inside the outer core. NASA

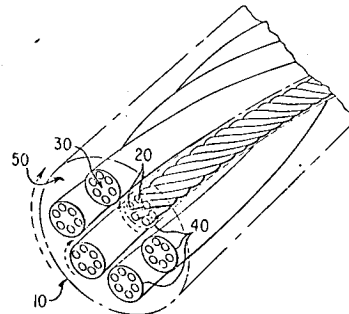


**N74-33739\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**METHOD OF MANUFACTURING COMPOSITE SUPERCONDUCTORS Patent Application**

Willard D. Coles, inventor (to NASA) Filed 30 Sep. 1974 10 p (NASA-Case-LEW-11582-1; US-Patent-Appl-SN-510678) Avail: NTIS HC \$4.00 CSCL 09A

Problems of magnetization and self-field instability in composite electrical superconductors are reduced or eliminated by an improved method for transposition of the filaments within the conductor. The method includes, as a first step, forming a composite strand by embedding superconductive filaments within a non-superconductive matrix. Filaments are arranged substantially parallel to the longitudinal axis of the conductor and form a linear, closed geometrical figure, such as a circle or square, in cross section. A twist is then imparted to the strand to transpose the filaments around the axis of the strand in a substantially helical path. A plurality of strands so produced are combined within an elongate non-superconductive matrix and arranged so that the strands are substantially parallel to the longitudinal axis of the matrix and form a linear closed figure. A twist is then imparted to the conductor so that each filament within the conductor is thus transposed along the axis of the conductor, and follows a modified helical path. NASA



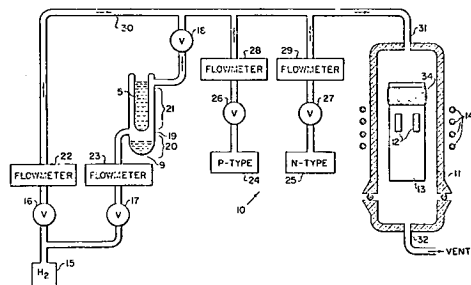
## 09 ELECTRONIC EQUIPMENT

**N74-33740\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### PROCESS FOR FABRICATING SiC SEMICONDUCTOR DEVICES Patent Application

J. Anthony Powell and Herbert A. Will, inventors (to NASA) Filed 24 Sep. 1974 15 p (NASA-Case-LEW-12094-1; US-Patent-Appl-SN-508784) Avail: NTIS HC \$4.00 CSCL 09A

Sections are cut from a SiC platelet such that the sections have a-faces parallel to the c-axis of the SiC platelet. The sections serve as substrates for the growth of SiC layers by attaching the substrates to a body which is then placed in a chamber and the chamber evacuated. Hydrogen is then admitted, and the body on which the substrates are mounted is heated to produce a temperature profile such that the subsequent admission of a carbon containing chlorosilane gas or a mixture of a chlorosilane gas and a hydrocarbon gas will cause free silicon to be deposited at one end of the body while SiC crystals grow on the substrates which are in a preferred temperature range. Dopant gases, either p-type or n-type, can be admitted with the chlorosilane or hydrocarbon gas to produce the desired type of semiconductor. NASA



**N74-34638\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### INTEGRATED P-CHANNEL MOS GYRATOR Patent

Erwin S. Hochmair, inventor (to NASA) (NAS-NRC) Issued 8 Oct. 1974 7 p Filed 2 Feb. 1973 Supersedes N73-18224 11 - 09, p 1008) Sponsored by NASA

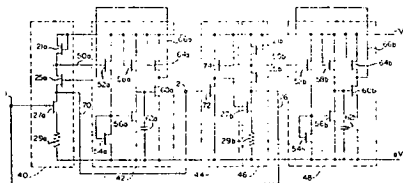
(NASA-Case-MFS-22343-1; US-Patent-3,840,829;

US-Patent-Appl-SN-329237; US-Patent-Class-307-295;

US-Patent-Class-307-304; US-Patent-Class-307-18;

US-Patent-Class-307-35) Avail: US Patent Office CSCL 09B

A gyrator circuit is described which is of the conventional configuration of two amplifiers in a circular loop, one producing zero phase shift and the other producing 180 phase reversal, in a circuit having medium Q composed of all field effect transistors of the same conductivity type. The current source to each gyrator amplifier comprises an amplifier which responds to changes in current, with the amplified signals feed back so as to limit current. The feedback amplifier has a large capacitor connected to bypass high frequency components, thereby stabilizing the output. The design makes possible fabrication of circuits with transistors of only one conductivity type, providing economies in manufacture and use. Official Gazette of the U.S. Patent Office



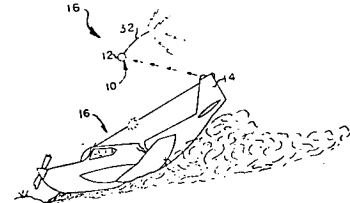
**N74-34647\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### AIRCRAFT MOUNTED CRASH ACTIVATED TRANSMITTER DEVICE Patent Application

Robert Manoli (Rockwell Intern. Corp.) and Bertram R. Ulrich, inventors (to NASA) (Rockwell Intern. Corp.) Filed 3 Oct. 1974 18 p Sponsored by NASA

(NASA-Case-MFS-16609-3; US-Patent-Appl-SN-511894) Avail: NTIS HC \$4.00 CSCL 09E

An aircraft crash location transmitting device is described that automatically ejects from an aircraft at the time of a crash and starts transmitting signals automatically. NASA



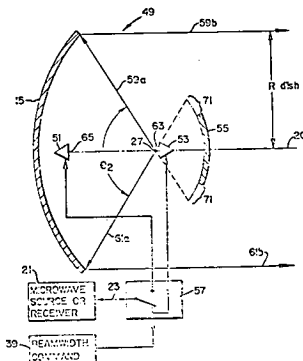
**N74-34649\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### TWO FEED DISH ANTENNA HAVING SWITCHABLE BEAMWIDTH Patent Application

Richard F. Schmidt, inventor (to NASA) Filed 4 Oct. 1974 17 p

(NASA-Case-GSC-11968-1; US-Patent-Appl-SN-512825) Avail: NTIS HC \$4.00 CSCL 09E

A switchable beamwidth antenna includes a concave parabolic main reflecting dish which has a central circular region and a surrounding coaxial annular region. A feed means selectively excites only the central region of the main dish via a truncated subreflector for wide beamwidth or substantially the entire main dish for narrow beamwidth. The feed means comprises a truncated concave ellipsoid subreflector and separate feed terminations located at two foci of the ellipsoid. One feed termination directly views all of the main dish while the other feed termination, exciting the main dish via the subreflector, excites only the central region because of the subreflector truncation. NASA



Includes circuit theory; and feedback and control theory. For applications see: 09 Electronic Equipment. For related information see specific Physics categories.

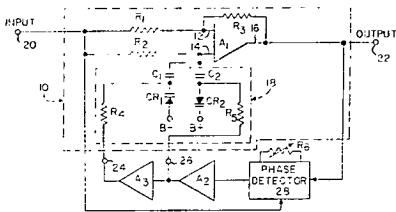
**N74-22885\*** National Aeronautics and Space Administration.  
Marshall Space Flight Center, Huntsville, Ala.

**LOW DISTORTION AUTOMATIC PHASE CONTROL  
CIRCUIT Patent**

Geir Hauge (Martin Marietta Corp., Denver) and Christ W. Pederson, inventors (to NASA) (Martin Marietta Corp., Denver)  
 Issued 30 Apr. 1974 5 p Filed 5 Feb. 1973 Supersedes  
 N73-172111 (11 - 08, p 0891) Sponsored by NASA  
 (NASA-Case-MFS-21671-1; US-Patent-3,808,517;  
 US-Patent-Appl-SN-329958; US-Patent-Class-323-106;  
 US-Patent-Class-323-122; US-Patent-Class-323-128) Avail:  
 US Patent Office CSCD 09E

A voltage controlled phase shifter is rendered substantially harmonic distortion free over a large dynamic input range by employing two oppositely poled, equally biased varactor diodes as the voltage controlled elements which adjust the phase shift. Control voltages which affect the bias of both diodes equally are used to adjust the phase shift without increasing distortion. A feedback stabilized phase shifter is rendered substantially frequency independent by employing a phase detector to control the phase shift of the voltage controlled phase shifter.

Official Gazette of the U.S. Patent Office



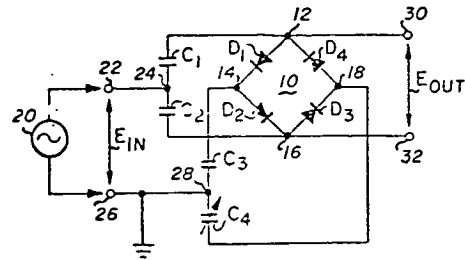
**N74-26760\*#** National Aeronautics and Space Administration.  
Ames Research Center, Moffett Field, Calif.

**DIODE QUAD TRANSDUCER AND DISCRIMINATOR  
CIRCUIT** Patent Application

John Dimeff and Dean R. Harrison, inventors (to NASA) Issued  
22 Apr. 1974 20 p  
(NASA-Case-ARC-10364-3; US-Patent-Appl-SN-462844) Avail:  
NTIS HC \$4.00 CSCL 09C

An electrical measuring apparatus consisting of a transducer and discriminator circuits using a four terminal circulating diode bridge is discussed. The bridge is used in combination with various impedance elements to produce an output signal which is proportional to a relationship between at least two of the impedance elements. Advantages of the circuit over previous similar devices are described. Diagrams of the circuit are provided.

NASA



**N74-27705\*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**DIFFERENTIAL PHASE SHIFT KEYED SIGNAL RESOLVER**  
Patent

Phillip M. Hopkins (Lockheed, Electron. Co., Houston, Tex.) and Wally M. Wallingford, inventors (to NASA) (Lockheed Electron. Co., Houston, Tex.) Issued 18 Jun. 1974 10 p Filed 12 Oct. 1972 Supersedes N73-10269 (11 - 01, p 0034) Sponsored by NASA

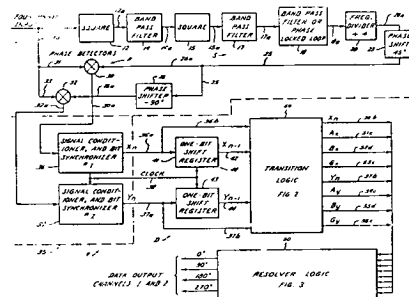
(NASA-Case-MSC-14066-1; US-Patent-3.818,346;

US-Patent-Appl-SN-297127; US-Patent-Class-325-320;

US-Patent-Class-178-88) Avail: US Patent Office CSCL 09E

A differential phase shift keyed signal resolver resolves the differential phase shift in the incoming signal to determine the data content thereof overcoming phase uncertainty without requiring a transmitted reference signal.

Official Gazette of the U.S. Patent Office



**N74-32711\*** National Aeronautics and Space Administration.  
Lyndon B. Johnson Space Center, Houston, Tex.

**PULSE STRETCHER FOR NARROW PULSES** Patent

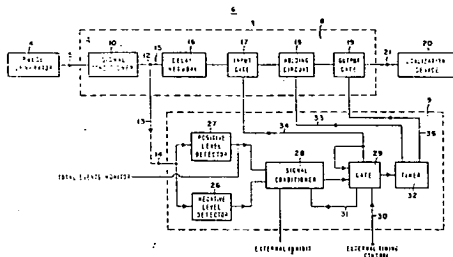
Reed S. Lindsey, Jr., inventor (to NASA) (Lockheed Electron. Co., Houston, Tex.) Issued 20 Aug. 1974 20 p Filed 25 Jun. 1973 Supersedes N73-26232 (11 - 17, p 2007) Sponsored

by NASA

(NASA-Case-MSC-14130-1; US-Patent-3,831,098;  
US-Patent-Appl-SN-373587; US-Patent-Class-328-58;  
US-Patent-Class-307-267) Avail: US Patent Office CSCL  
09C

A pulse stretcher for narrow pulses is presented. The stretcher is composed of an analog section for processing each arriving analog pulse and a digital section with logic for providing command signals to the gates and switches in the analog section.

Official Gazette of the U.S. Patent Office



**N74-32712\*** National Aeronautics and Space Administration.  
Pasadena Office, Calif.

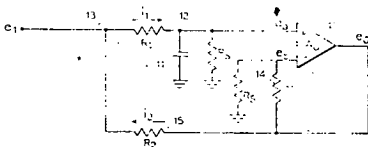
**CAPACITANCE MULTIPLIER AND FILTER SYNTHESIZING  
NETWORK Patent**

Arthur J. Kline, inventor (to NASA) (Motorola, Inc., Scottsdale,  
Ariz.) Issued 20 Aug. 1974 21 p Filed 15 Nov 1972  
Supersedes N73-15255 (11 06, p 0647) Sponsored by  
NASA

(NASA-Case-NPO-11948-1; US-Patent-3,831,117;  
US-Patent-Appl-SN-306652; US-Patent-Class-333-80R;  
US-Patent-Class-330-69; US-Patent-Class-307-230) Avail: US  
Patent Office CSCL 09C

A circuit using a differential amplifier multiplies the capac-  
tance of a discrete interacting capacitor by  $(r_{sub 1} + R_{sub 2})/R_{sub 2}$ ,  
where  $R_{sub 1}$  and  $R_{sub 2}$  are values of discrete  
resistor coupling an input signal  $e_{sub 1}$  of the amplifier inputs.  
The output  $e_{sub 0}$  of the amplifier is fed back and added to  
the signal coupled by the resistor  $R_{sub 2}$  to the amplifier  
through a resistor of value  $R_{sub 1}$ . A discrete resistor  $R_{sub x}$   
may be connected in series for a lag filter, and a discrete resistor  
may be connected in series with the capacitor for a lead-lag  
filter. Voltage dividing resistors  $R_{sub a}$  and  $R_{sub b}$  may be  
included in the feedback circuit of the amplifier output  $e_{sub 0}$   
to independently adjust the circuit gain  $e_{sub i}/e_{sub 0}$ .

Official Gazette of the U.S. Patent Office



# 11 FACILITIES, RESEARCH AND SUPPORT

Includes airports; lunar and planetary bases including associated vehicles; ground support systems; related logistics; simulators; test facilities (e.g., rocket engine test stands, shock tubes, and wind tunnels); test ranges; and tracking stations.

**N74-26767\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

## DISPENSING TARGETS FOR ION BEAM PARTICLE GENERATORS Patent

Charles G. Miller, inventor (to NASA) (JPL) Issued 11 Jun. 1974 6 p Filed 29 Jun. 1972 Supersedes N73-29138 (11 - 20, p 2382) Sponsored by NASA

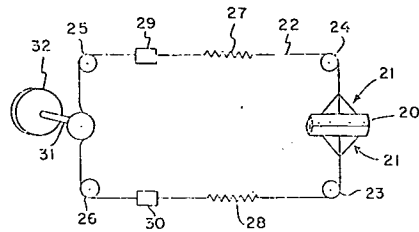
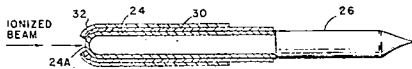
(NASA-Case-NPO-13112-1; US-Patent-3,816,785;

US-Patent-Appl-SN-267572; US-Patent-Class-313-61S;

US-Patent-Class-250-499) Avail: US Patent Office CSCI 14B

A target for dispensing high energy protons or neutrons or ionized atoms or ionized molecules is provided which comprises a container for the target gas, which is at atmospheric or higher pressure. The container material can release the target gas in the spot where the container is heated above a predetermined temperature by the impact of an ion beam where protons or neutrons are desired, or by electrons where ionized atoms or molecules are desired. On the outside of the container, except for the region where the beam is to impact, there is deposited a layer of a metal which is impervious to gaseous diffusion. A further protective coating of a material is placed over the layer of metal, except at the region of the ion impact area in order to adsorb any unreacted gas in the vacuum in which the target is placed, to thereby prevent reduction of the high vacuum, as well as contamination of the interior of the vacuum chamber.

Official Gazette of the U.S. Patent Office



**N74-32718\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

## VEHICLE SIMULATOR BINOCULAR MULTIPLANAR VISUAL DISPLAY SYSTEM Patent Application

Wendell D. Chase, inventor (to NASA) Filed 13 Sep. 1974 20 p

(NASA-Case-ARC-10808-1; US-Patent-Appl-SN-505881) Avail: NTIS HC \$4.00 CSCI 14B

An aircraft simulator is described for affording practice in landing maneuvers and the like. A cathode ray tube (CRT) produces an image corresponding to the runway which image changes in response to the trainee's manipulation of controls. The CRT image is projected along an optical path to a screen that is visually accessible to the trainee. Interposed in the optical path are optical elements such as mirrors which are spaced from one another along the optical path so as to create virtual images on the screen that appear to be at different distances from the trainee. The optical elements are sequentially interposed in the path. Means are provided for synchronizing the production of the CRT image with one of the optical elements so that the image on the screen appears to the trainee to have a range corresponding to the environment being simulated by the CRT image. NASA

**N74-30597\*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

## APPARATUS FOR APPLYING SIMULATOR g-FORCES TO AN ARM OF AN AIRCRAFT SIMULATOR PILOT Patent

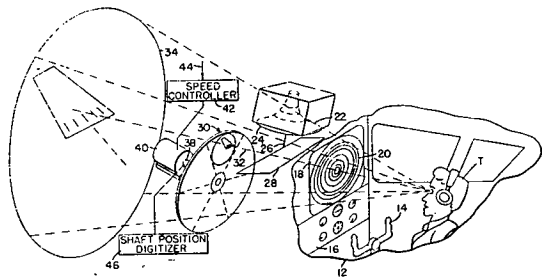
Billy R. Ashworth and John T. Merrill, IV, inventors (to NASA) Issued 23 Jul. 1974 4 p Filed 9 Jun. 1972 Supersedes N72-27271 (10 - 18, p 2407)

(NASA-Case-LAR-10550-1; US-Patent-3,824,707;

US-Patent-Appl-SN-261183; US-Patent-Class-35-12E) Avail: US Patent Office CSCI 14B

A device to be used with an aircraft simulator to apply positive and negative g forces to the pilot's arm is described. An arm harness fits around the arm which the pilot uses to operate the throttle. The device allows the harness to track intentional arm movements without exerting any restraining forces, and at the same time, applies g forces to the pilot's arm which are recorded by the aircraft simulator computer.

Official Gazette of the U.S. Patent Office





## 11 FACILITIES, RESEARCH AND SUPPORT

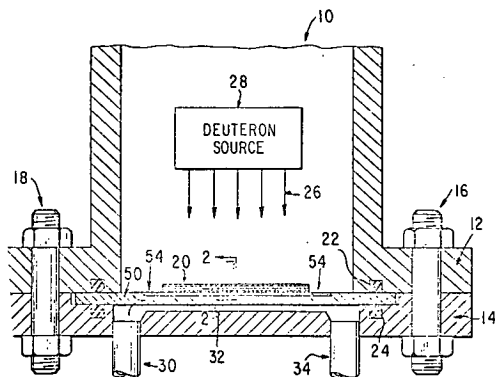
**N74-32719\*#** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

### **DEUTERIUM PASS THROUGH TARGET Patent Application**

Donald L. Alger, inventor (to NASA) Filed 27 Aug. 1974  
20 p

(NASA-Case-LEW-11866-1; US-Patent-Appl-SN-500980) Avail:  
NTIS HC \$4.00 CSCL 14B

A neutron emitting target is used for neutron generating. A deuterium source and an accelerator vacuum chamber comprise a tritium-containing target layer, a deuterium accumulation layer, and a target support containing passages providing communication between the accumulation layer and portions of the surface. With this arrangement, deuterons passing through the target layer and implanting in and diffusing through the accumulation layer, diffuse into the communication passages and are returned to the accelerator vacuum chamber. NASA



**N74-34672\*** National Aeronautics and Space Administration.  
Langley Research Center, Langley Station, Va.

### **OPEN TUBE GUIDEWAY FOR HIGH SPEED AIR CUSHIONED VEHICLES Patent**

Rodney S. Goering, inventor (to NASA) Issued 24 Sep. 1974  
4 p Filed 26 Jan. 1972 Supersedes N72-20253 (10 - 11,  
p 1452)

(NASA-Case-LAR-10256-1; US-Patent-3,837,285;

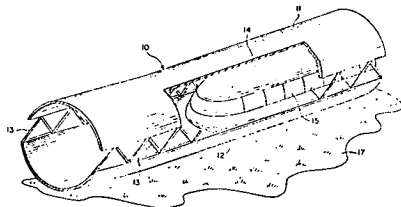
US-Patent-Appl-SN-220785; US-Patent-Class-104-23FS;

US-Patent-Class-238-134; US-Patent-Class-104-138R) Avail:

US Patent Office CSCL 13F

This invention is a tubular shaped guideway for high-speed air-cushioned supported vehicles. The tubular guideway is split and separated such that the sides of the guideway are open. The upper portion of the tubular guideway is supported above the lower portion by truss-like structural members. The lower portion of the tubular guideway may be supported by the terrain over which the vehicle travels, on pedestals or some similar structure.

Official Gazette of the U.S. Patent Office



## 12 FLUID MECHANICS

Includes boundary-layer flow; compressible flow; gas dynamics; hydrodynamics; and turbulence. For related information see also: 01 Aerodynamics; and 33 Thermodynamics and Combustion.

**N74-25805\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

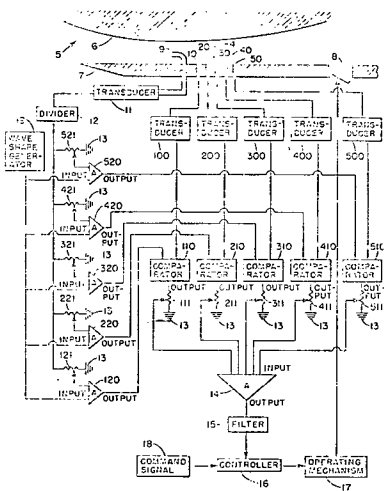
### SHOCK POSITION SENSOR FOR SUPERSONIC INLETS Patent Application

Miles O. Dustin, inventor (to NASA) Issued 30 May 1974 14 p

(NASA-Case-LEW-11915-1; US-Patent-Appl-SN-474744) Avail: NTIS HC \$4.00 CSCL 01A

Static pressure taps or ports are provided in the throat of a supersonic inlet and signals indicative of the pressure at each of the ports is fed to respective comparators. Means is also provided for directing a signal indicative of the total throat pressure to the comparators. A periodic signal is superimposed on the total throat pressure so that the signal from the static pressure taps is compared to a varying scan signal rather than to total throat pressure only. This type of comparison causes each comparator to provide a pulse width modulated output which may vary from 0 percent time on to 100 percent time on. The pulse width modulated outputs of the comparators are summed, filtered and directed to a controller which operates a bypass valve such as a door whereby air is dumped from the inlet to prevent the shock wave from being expelled out the front.

NASA



**N74-27730\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### APPARATUS FOR ESTABLISHING FLOW OF A FLUID MASS HAVING A KNOWN VELOCITY Patent

Peter Price (Inca Eng. Corp.), Olgerts Veikins (Inca Eng. Inc.), Edward R. Bate, Jr. (Inca Eng. Corp.), and Robert H. Jones, inventors (to NASA) Issued 18 Jun. 1974 8 p Filed 14 Dec. 1972 Supersedes N73-16248 (11 - 07, p 0769) Sponsored by NASA

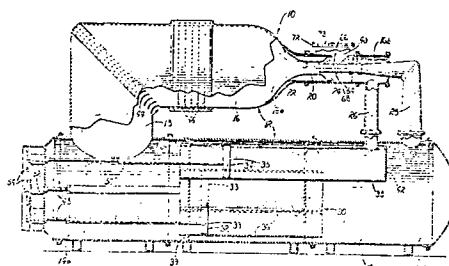
(NASA-Case-MFS-21424-1; US-Patent-3,817,082;

US-Patent-Appl-SN-315048; US-Patent-Class-73-3;

US-Patent-Class-73-147) Avail: US Patent Office CSCL 20D

An apparatus for establishing a flow of fluid mass, such as gas, having a known velocity is introduced. The apparatus is characterized by an hermetically sealed chamber conforming to a closed-loop configuration and including a throat and a plurality of axially displaceable pistons for sweeping through the throat a stream of gas including a core and an unsheared boundary layer. Within the throat there is a cylindrical coring body concentrically related to the throat for receiving the core, and a chamber surrounding the cylindrical body for drawing off the boundary layer, whereby the velocity of the core is liberated from the effects of the velocity of the boundary layer.

Official Gazette of the U.S. Patent Office



**N74-27744\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### APPARATUS FOR CONDUCTING FLOW ELECTROPHORESIS IN THE SUBSTANTIAL ABSENCE OF GRAVITY Patent

Richard N. Griffin (GE, Philadelphia) and Louis R. McCreight, inventors (to NASA) (GE, Philadelphia) Issued 28 Jun. 1974 5 p Filed 31 May 1972 Supersedes N72-27310 (10 - 18, p 2412) Sponsored by NASA

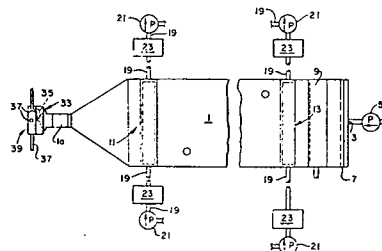
(NASA-Case-MFS-21394-1; US-Patent-3,821,102;

US-Patent-Appl-SN-258171; US-Patent-Class-204-299;

US-Patent-Class-204-180R) Avail: US Patent Office CSCL 20D

A zero-g, constant flow, electrophoretic separating apparatus is presented. The apparatus is composed a deflecting member to spread carrier fluid across a conduit, and an end wall with a valve located in the conduit past the separation electrodes from which layers of carrier and sample may be extracted. Electrode electrolyte is separated from the carrier and continually circulated and cleaned.

Official Gazette of the U.S. Patent Office



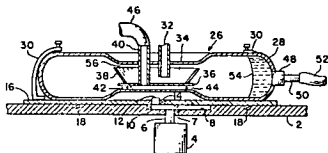
**N74-29652\*** National Aeronautics and Space Administration.  
Langley Research Center, Langley Station, Va.

**FLUID CONTROL APPARATUS AND METHOD Patent Application**

Charles W. McKee, inventor (to NASA) Issued 30 Nov. 1973  
12 p

(NASA-Case-LAR-11110-1; US-Patent-Appl-SN-420424) Avail:  
NTIS HC \$4.00 CSCL 20D

An apparatus for controlling fluids and gases in a zero gravity environment is described. The device consists of a circumnulating chamber which applies centrifugal force in separating gas from liquid. The liquid is forced by the circumnulating motion to travel in a path around the circular wall and periodically past a valve which drains off only the liquid. Gases are removed by a conduit which is protected from fluid droplets by baffles. The construction of the device makes it possible to eliminate seals between the moving parts of the system. P.N.F.



**N74-30608\*** National Aeronautics and Space Administration.  
Langley Research Center, Langley Station, Va.

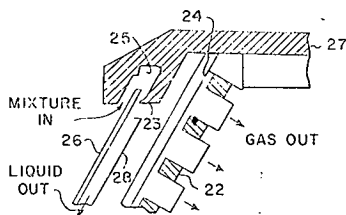
**CENTRIFUGAL LYOPHOBIC SEPARATOR Patent**

Franklin W. Booth and Robert A. Bruce, inventors (to NASA)  
Issued 13 Aug. 1974 8 p Filed 9 Aug. 1971 Supersedes  
N72-11293 (10 - 02, p 0187)

(NASA-Case-LAR-10194-1; US-Patent-3,828,524;  
US-Patent-Appl-SN-169962; US-Patent-Class-55-43;  
US-Patent-Class-55-159; US-Patent-Class-55-199) Avail: US  
Patent Office CSCL 20D

A centrifugal separator is described using a lyophobic filter for removing liquid particles from a mixed stream of gas and liquid under various negative or positive external acceleration conditions as well as zero g or weightless conditions. Rotating the lyophobic filter and inclining the filter to the entering flow improves the lyophobic properties of the filter, provides gross separation of larger liquid particles, and prevents prolonged contact of liquid droplets with the spinning filter which might change the filter properties or block the filter.

Official Gazette of the U.S. Patent Office



# 13 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; oceanography; cartography; and geodesy. For related information see also: 20 Meteorology; 29 Space Radiation; and 30 Space Sciences.

**N74-32780\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

## **AN OPTICAL PROCESS FOR PRODUCING CLASSIFICATION MAPS FROM MULTISPECTRAL DATA Patent Application**

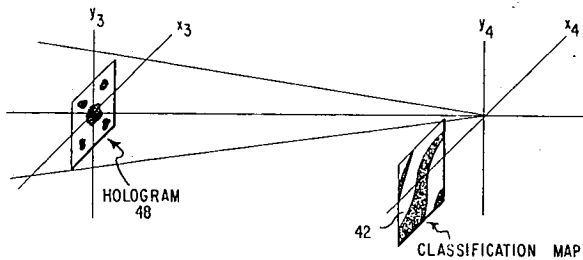
Richard E. Haskell, inventor (to NASA) (Oakland Univ.) Filed 30 Aug. 1974 29 p

(Grant NGR-23-054-006)

(NASA-Case-MSC-14472-1; US-Patent-Appl-SN-502138) Avail: NTIS HC \$4.50 CSCL 08B

A method of producing single-class and multi-class composite classification maps from multispectral data is provided. The multispectral data is transformed into a binary matrix format which is then encoded on an optical medium such as photographic film. The encoded data is holographically correlated with coded patterns representing selected spectral signatures to produce signal-class classification maps. Several single-class maps are optically superimposed to produce multi-class composite classification maps.

NASA



## 14 INSTRUMENTATION AND PHOTOGRAPHY

Includes design, installation, and testing of instrumentation systems; gyroscopes; measuring instruments and gages; recorders; transducers; aerial photography; and telescopes and cameras.

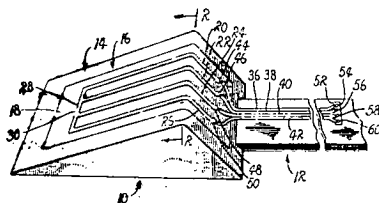
**N74-22095\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

### THIN FILM GAUGE Patent

Angus D. McDonald, inventor (to NASA) (JPL) Issued 14 Mar. 1972 4 p Filed 29 May 1969 Supersedes N70-12618 (08 - 02, p 0288) Sponsored by NASA (NASA-Case-NPO-10617-1; US-Patent-3,648,516; US-Patent-Appl-SN-828920; US-Patent-Class-73-190H) Avail: US Patent Office CSCL 14B

A thin film gauge for use in measuring distributed convective heat transfer rates occurring along given surfaces, is described. The gauge is particularly suited to measuring test surfaces in the air stream of a wind tunnel. The gauge is characterized by a plurality of painted platinum leads extend across the surface of a substrate; a pair of leads on the surface is adapted to deliver an electric current at a constant amperage through a selected thermally active area. Leads are also coupled at opposite sides of the thermally active area for detecting induced voltage drops occurring in the area so that the active length of the gauge is defined between voltage output leads. Changes in heat transfer to the thermally active area are isolated and determined by detecting induced changes in voltage drop.

Official Gazette of the U.S. Patent Office



**N74-22096\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

### LOW LEVEL SIGNAL LIMITER Patent

Irving G. Hansen and Victor S. Peterson, inventors (to NASA) Issued 1 Oct. 1968 4 p Filed 22 Sep. 1966 (NASA-Case-XLE-04791; US-Patent-3,404,348; US-Patent-Appl-SN-582213; US-Patent-Class-330-103) Avail: US Patent Office CSCL 14B

A limiting circuit is described which prevents a signal being supplied to a signal amplifier from exceeding a predetermined value. The circuit is designed to permit a signal voltage to be fed directly to a signal amplifier without passing through the operational amplifier and without being altered undesirably. When the signal level increases to the predetermined value, the summing point shifts from the input of the operational amplifier to the output of the limiting circuit.

D.L.G.

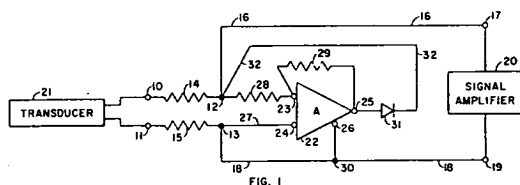


FIG. 1

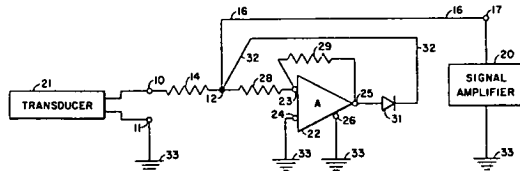


FIG. 2

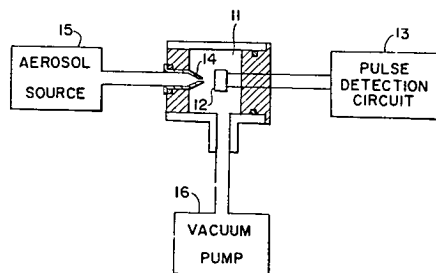
**N74-22112\*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

### PARTICULATE AND AEROSOL DETECTOR Patent Application

Jimmie J. Wortman (Res. Triangle Inst.), Robert P. Donovan (Res. Triangle Inst.), Arthur P. Brooks (Res. Triangle Inst.), Larry K. Monteith (Res. Triangle Inst.), William H. Minard, and Robert L. O'Neal, inventors (to NASA) Filed 26 Apr. 1974 13 p (NASA-Case-LAR-11434-1; US-Patent-Appl-SN-464722) Avail: NTIS HC \$4.00 CSCL 14B

The invention relates to a device for detecting and counting micron size particles suspended in a gas. The basic principle of the sensor operation is that a charged capacitor can have a discharge initiated by the impact of a high velocity particle. With suitable construction methods and under appropriate biasing and impacting conditions, the impacting particle creates a discharge path which is self-healing; that is, the incident particle initiates a discharge path through which the capacitor discharges in such a fashion as to vaporize or blow out the conducting path in the process. Once the discharge action is complete, the low resistance path no longer exists between the two capacitor plates and the capacitor is again able to accept a charge. By monitoring the voltage on a capacitor plate the density and size of particles directed into the capacitor can be determined.

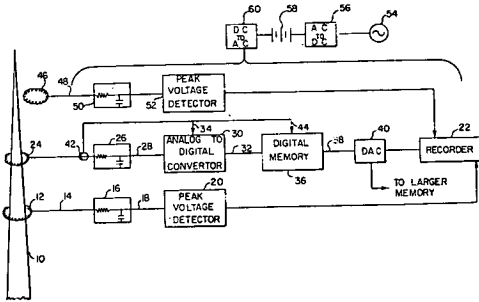
NASA



**N74-22113\*** National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.  
**LIGHTNING CURRENT MEASURING SYSTEMS Patent Application**  
 Ronald J. Wojtasinski, James H. Jones, and Raymond V. Lisle, inventors (to NASA) Filed 15 Apr. 1974 14 p  
 (NASA-Case-KSC-10807-1; US-Patent-Appl-SN-461073) Avail: NTIS HC \$4.00 CSCL 14B

An apparatus for monitoring and analyzing electrical currents produced by lightning strikes is described. The apparatus includes an electrically conductive mast which has currents produced responsive to lightning strikes. A first circuit means is coupled to the mast for generating DC voltage proportional to a peak current generated in the mast by each lightning strike. The first circuit includes a first coil encircling the mast for sensing the flux change produced by current flowing through the mast which is caused by a lightning strike and for generating a voltage responsive thereto. An integrator is coupled to the first coil for generating an integrated voltage proportional to the flux change sensed by the first coil. A peak voltage detector is coupled to the integrator for generating a voltage having an amplitude proportional to the peak of the integrated voltage. A second circuit means is coupled to the mast for generating digital signal representative of the wave shape of the current generated in the mast by each lightning strike.

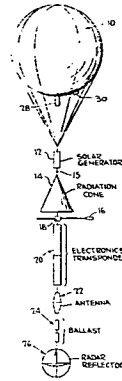
Author



**N74-23039\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**APPARATUS FOR CONTROLLING THE TEMPERATURE OF BALLOON-BORNE EQUIPMENT Patent**  
 Milton Schach and Jack J. Triolo, inventors (to NASA) Issued 30 Apr. 1974 5 p Filed 14 Aug. 1972 Supersedes N72-33379 (10 - 24, p 3214)  
 (NASA-Case-GSC-11620-1; US-Patent-3,807,384; US-Patent-Appl-SN-280305; US-Patent-Class-126-270; US-Patent-Class-244-31; US-Patent-Class-244-127) Avail: US Patent Office CSCL 14B

A novel apparatus for controlling the temperature of balloon-borne equipment is disclosed, the apparatus serving to utilize the radiant energy emitted by the earth and its atmosphere so as to control the temperature of equipment. The apparatus comprises a housing to be carried aloft by a balloon and defining an enclosure for an instrumentation package. The enclosure includes an upper shield portion as well as a bottom window portion at the base, the bottom window facing the earth below during flight. The upper shield portion is constructed of a material such as aluminized Mylar, which serves to reflect direct sunlight.

Official Gazette of the U.S. Patent Office



**N74-23040\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

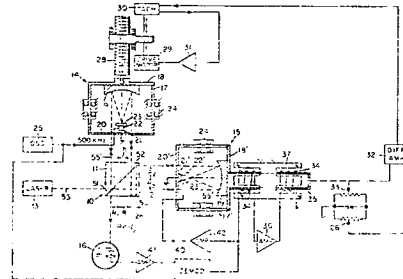
**SINGLE REFLECTOR INTERFERENCE SPECTROMETER AND DRIVE SYSTEM THEREFOR Patent**

Rudolf A. Schindler, inventor (to NASA) (JPL) Issued 7 May 1974 10 p Filed 1 Dec. 1972 Supersedes N73-29438 (11 - 20, p 29438) Avail: US Patent Office (NASA-Case-NPO-11932-1; NASA-Case-NPO-13127-1; US-Patent-3,809,481; US-Patent-Appl-SN-311234; US-Patent-Class-356-1065; US-Patent-Class-356-113)

Sponsored by NASA CSCL 20F

In a Fourier interference spectrometer of the doublepass retroreflector type, a single mirror is employed in the path of both split beams of an incoming ray to cause them to double back through separate retroreflectors. Changes in optical path length are achieved by linear displacement of both retroreflectors using a motor driven lead screw on one for large, low frequency changes, a moving-coil actuator on the other for smaller, mid-frequency changes and a piezoelectric actuator on one of these two for small, high frequency changes.

Official Gazette of the U.S. Patent Office



**N74-25931\*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

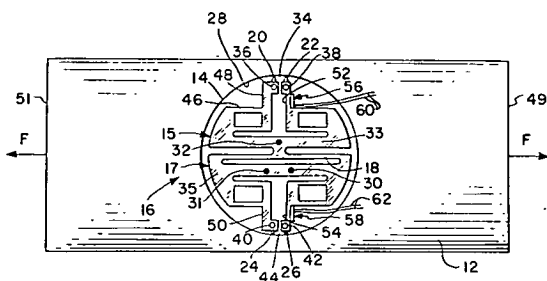
**SELF-SUPPORTING STRAIN TRANSDUCER Patent Application**

Ira S. Hoffman, inventor (to NASA) Issued 23 May 1974 11 p  
 (NASA-Case-LAR-11263-1; US-Patent-Appl-SN-472775) Avail: NTIS HC \$4.00 CSCL 14B

A strain transducer for use in the measurement of static or quasi-static high strain levels at stress concentration points in holes in flat plates is described. Cantilever springs constructed by machining the material to appropriate flexibility, permit self-alignment, and constant contact with the test specimen. Used in conjunction with a strain gage or other transducer, it enables testing far beyond the strain gage's normal limits for high strains and number of load cycles.

NASA

## 14 INSTRUMENTATION AND PHOTOGRAPHY



**N74-25932\*** National Aeronautics and Space Administration, Pasadena Office, Calif.

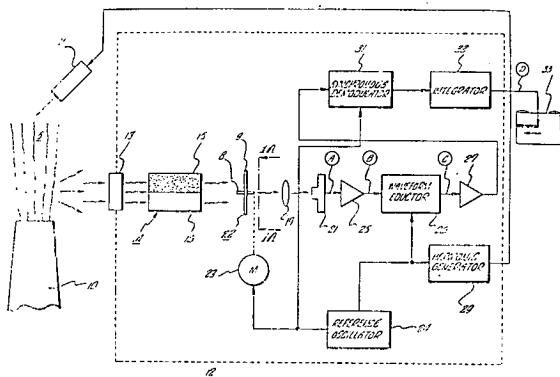
### FLUORESCENCE DETECTOR FOR MONITORING ATMOSPHERIC POLLUTANTS Patent Application

Robert T. Menzies, Inventor (to NASA) (JPL) Issued 27 Dec. 1973 12 p

(Contract NAS7-100)

(NASA-Case-NPO-13231-1; US-Patent-Appl-SN-428993) Avail: NTIS HC \$4.00 CSCL 14B

A gas molecule detector was used to discover the presence of pollutants in the atmosphere. A laser source excites the pollutants to fluorescence and emit a return signal to the detector. The pollutants are captured in a gas cell containing two compartments. The first absorbs the fluorescence from the signal and the second contains the absorbed emission. A difference measuring circuit detects the difference in output signals from the two compartments in order to obtain a signal indicative of the magnitude of the pollutant being analyzed. NASA



**N74-26945\*** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

### DEVICE FOR MONITORING A CHANGE IN MASS IN VARYING GRAVIMETRIC ENVIRONMENTS Patent

Joseph P. Valinsky, inventor (to NASA) (McDonnell-Douglas Corp., Huntington Beach, Calif.) Issued 28 May 1974 5 p Filed 13 Mar. 1973 Sponsored by NASA

(NASA-Case-MFS-21556-1; US-Patent-3,812,924;

US-Patent-Appl-SN-340791; US-Patent-Class-177-200;

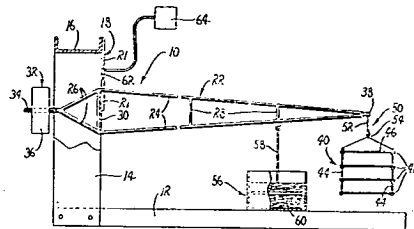
US-Patent-Class-177-211; US-Patent-Class-177-246;

US-Patent-Class-73-141A) Avail: US Patent Office CSCL 14B

A remotely operable device for detecting changes as they occur in the mass of a selected specimen is described. The device is characterized by a balance beam including at one end a support for receiving a specimen having a changing mass and suspension means, including a flexure, supporting the beam near

its center of gravity for pivotal movement proportional to changes occurring in the mass of the specimen. Strain gages coupled with the flexure provide a read-out indicative of the pivotal movement imparted to the beam.

Official Gazette of the U.S. Patent Office



**N74-26946\*** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

### HOLOGRAPHY UTILIZING SURFACE PLASMON RESONANCES Patent

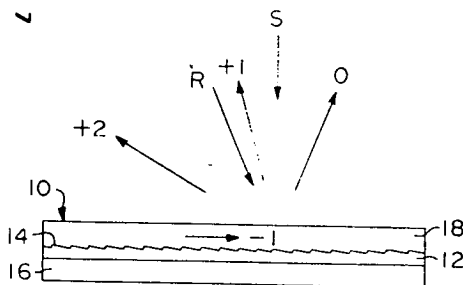
James J. Cowan, inventor (to NASA) (NASA-NRC) Issued 11 Jun. 1974 4 p Filed 31 May 1973 Sponsored by NASA

(NASA-Case-MFS-22040-1; US-Patent-3,815,969;

US-Patent-Appl-SN-365644; US-Patent-Class-350-3.5;

US-Patent-Class-96-38.3; US-Patent-Class-96-79) Avail: US Patent Office CSCL 14E

A holographic recording medium with a substrate which has a diffraction grating composed of a number of spaced line ridges on the surface is discussed. The first layer consists of a metal with a plasma wavelength shorter than that of the selected light source. A second layer, or coating, on top of the first layer consists of a thin film of photosensitive emulsion. A diagram of the device is provided. The principles of operation are explained. Official Gazette of the U.S. Patent Office



**N74-26947\*** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

### CHROMATO-FLUOROGRAPHIC DRUG DETECTOR Patent

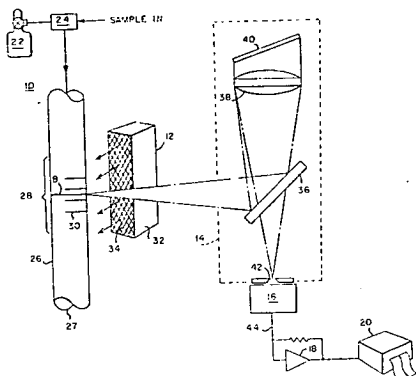
John A. Parker, John Dimeff, and Alvin H. Heimbuch, inventors (to NASA) Issued 4 Jun. 1974 5 p Filed 25 Apr. 1973

(NASA-Case-ARC-10633-1; US-Patent-3,814,939;

US-Patent-Appl-SN-354611; US-Patent-Class-250-373;

US-Patent-Class-250-343; US-Patent-Class-250-304) Avail: US Patent Office CSCL 14B

A drug detecting apparatus which includes a chromatographic system for separating particular substances from a sample solution passed through it is described. A source of radiation causes the substance to emit fluorescent radiation as it moves through the chromatographic system. An optical system spectrally separates the fluorescent radiation according to wavelength and for focusing particular portions of the separated spectrum through an exit aperture. A photodetector which is responsive to the radiation passing through the exit aperture develops an electrical signal commensurate with the intensity of the radiation. The electrical signal is recorded to provide an indication of certain characteristics of the substance. Official Gazette of the U.S. Patent Office



**N74-26949\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**COAXIAL ANODE WIRE FOR GAS RADIATION COUNTERS Patent**

William L. Kraushaar, inventor (to NASA) (Wisconsin Univ., Madison) Issued 21 May 1974 6 p Filed 21 Jun. 1973 Sponsored by NASA

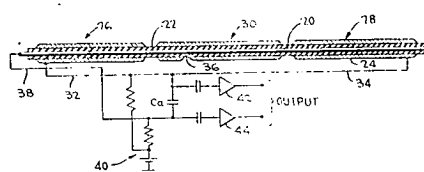
(NASA-Case-GSC-11492-1; US-Patent-3,812,358;

US-Patent-Appl-SN-372148; US-Patent-Class-250-385;

US-Patent-Class-250-374; US-Patent-Class-313-93) Avail: US Patent Office CSCL 14B

The design and characteristics of a gas radiation counter are discussed. The coaxial anode consists of an elongated central wire covered with an electrically insulating sleeve. Several longitudinally discontinuous segments of an electrically conductive coating are disposed about the insulating sleeve in a coaxial pattern along the length of the central wire. The conductive coating segments form a veto or rejection anode at each end of the central wire and a main or primary charge detecting anode between the ends. The segments are coupled together so that the primary charge detecting anode is connected to detection circuitry in anti-coincidence with the veto anodes. Background radiation detected by either of the veto anodes and the primary charge detecting anode is rejected and the sensitivity of the radiation counter device is increased.

Official Gazette of the U.S. Patent Office



**N74-26948\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

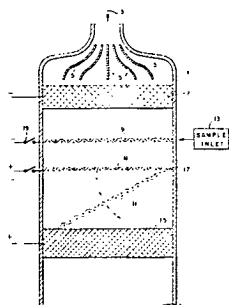
**ELECTROPHORETIC SAMPLE INSERTION Patent**

Louis R. McCreight, inventor (to NASA) (GE, Philadelphia) Issued 4 Jun. 1974 4 p Filed 6 Jun. 1972 Sponsored by NASA (NASA-Case-MFS-21395-1; US-Patent-3,814,678;

US-Patent-Appl-SN-260093; US-Patent-Class-204-180R) Avail: US Patent Office CSCL 14B

Two conductive screens located in the flow path of an electrophoresis sample separation apparatus are charged electrically. The sample is introduced between the screens, and the charge is sufficient to disperse and hold the samples across the screens. When the charge is terminated, the samples are uniformly distributed in the flow path. Additionally, a first separation by charged properties has been accomplished.

Official Gazette of the U.S. Patent Office



**N74-27859\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**HEAT FLOW CALORIMETER Patent**

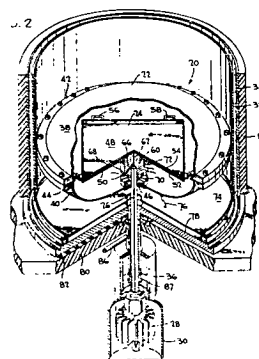
James C. Fletcher (N. Am. Rockwell Corp., Canoga Park, Calif.) and William V. Johnston, inventors (to NASA) (N. Am. Rockwell Corp., Canoga Park, Calif.) Issued 4 Jun. 1974 9 p Filed 16 Jun. 1972 Supersedes N72-27430 (10 - 18, p 2428) Sponsored by NASA

(NASA-Case-GSC-11434-1; US-Patent-3,813,937;

US-Patent-Appl-SN-263498; US-Patent-Class-73-190R) Avail: US Patent Office CSCL 14B

Heat flow calorimeter devices are used to measure heat liberated from or absorbed by an object. This device is capable of measuring the thermal output of sealed nickel-cadmium batteries or cells during charge-discharge cycles. An elongated metal heat conducting rod is coupled between the calorimeter vessel and a heat sink, thus providing the only heat exchange path from the calorimeter vessel itself.

Official Gazette of the U.S. Patent Office





## 14 INSTRUMENTATION AND PHOTOGRAPHY

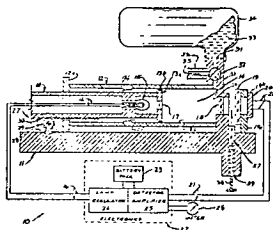
**N74-27860\*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

### SPECIFIC WAVELENGTH COLORIMETER Patent

Carle C. Brawner (Beckman Instr., Inc., Fullerton, Calif.), Larry S. McDavid (Beckman Instr., Inc., Fullerton, Calif.), and John M. Walsh, inventors (to NASA) (Beckman Instr., Inc., Fullerton, Calif.) Issued 18 Jun. 1974 9 p. Filed 13 Feb. 1973 Supersedes N73-18443 (11-09, p 1035) Sponsored by NASA (NASA-Case-MSC-14081-1; US-Patent-3,817,627; US-Patent-Appl-SN-331760; US-Patent-Class-356-180; US-Patent-Class-356-246; US-Patent-Class-250-576) Avail: US Patent Office CSCL 14B

A self contained, specific wavelength, single beam colorimeter is described for direct spectrophotometric measurement of the concentration of a given solute in a test sample. An electrical circuit employing a photoconductive cell converts the optical output into a linear, directly readable meter output. The colorimeter is simple to operate and is adapted for use in zero gravity conditions. In a specific application, the colorimeter is designed to analyze the concentration of iodine in potable water carried aboard a space vehicle such as the 4B stage of Skylab.

Official Gazette of the U.S. Patent Office



**N74-27861\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

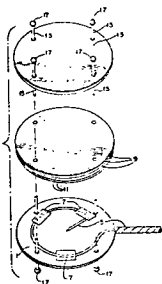
### STEADY STATE THERMAL RADIOMETERS Patent

Jack D. Loose, inventor (to NASA) Issued 25 Jun. 1974 6 p. Filed 17 Nov. 1972 Supersedes N73-12455 (11-03, p 0301)

(NASA-Case-MFS-21108-1; US-Patent-3,819,419; US-Patent-Appl-SN-307728; US-Patent-Class-136-213; US-Patent-Class-136-230; US-Patent-Class-136-233) Avail: US Patent Office CSCL 14B

A radiometer is described operating in a vacuum under steady state conditions. The front element is an aluminum sheet painted on the outer side with black or other absorptive material of selected characteristics. A thermocouple is bonded to the inner side of the aluminum sheet. That is backed by highly insulative layers of glass fiber and crinkled, aluminized Mylar polyester. Those layers are backed with a sturdy, polyester sheet, and the entire lamination is laced together by nylon cords. The device is highly reliable in that it does not drift out of calibration, and is significantly inexpensive.

Official Gazette of the U.S. Patent Office



**N74-27862\*** National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

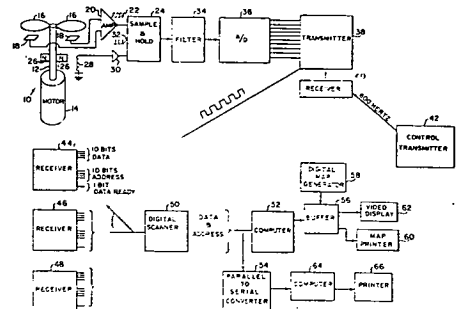
### ELECTRIC FIELD MEASURING AND DISPLAY SYSTEM Patent

Ronald J. Wojtasinski and Donald D. Lovall, inventors (to NASA) Issued 25 Jun. 1974 5 p. Filed 13 Sep. 1972 Supersedes N73-10461 (11-01, p 0056)

(NASA-Case-KSC-10731-1; US-Patent-3,920,095; US-Patent-Appl-SN-288847; US-Patent-Class-340-200; US-Patent-Class-73-170R; US-Patent-Class-340-182; US-Patent-Class-340-151; US-Patent-Class-324-72) Avail: US Patent Office CSCL 14B

An apparatus is described for monitoring the electric fields of cloud formations within a particular area. It utilizes capacitor plates that are alternately shielded from the clouds for generating an alternating signal corresponding to the intensity of the electric field of the clouds. A synchronizing signal is produced for controlling sampling of the alternating signal. Such samplings are fed through a filter and converted by an analogue to digital converter into digital form and subsequently fed to a transmitter for transmission to the control station for recording.

Official Gazette of the U.S. Patent Office



**N74-27864\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

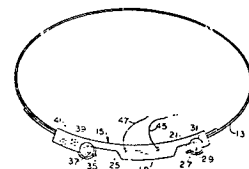
### CONDUCTIVE ELASTOMERIC EXTENSOMETER Patent

Raymond L. Gause and C. G. Glenn, inventors (to NASA) Issued 28 Jun. 1974 4 p. Filed 7 Nov. 1972 Supersedes N73-11405 (11-02, p 0173)

(NASA-Case-MFS-21049-1; US-Patent-3,820,529; US-Patent-Appl-SN-304430; US-Patent-Class-128-2S; US-Patent-Class-73-88.5R; US-Patent-Class-338-5; US-Patent-Class-338-114) Avail: US Patent Office CSCL 14B

An extensometer was used for measuring surface area changes of the human body caused by expansion and contraction of the body. A relatively thin and wide strain responsive conductive elastomeric band was adapted for application to a part of the body, such as around a limb or the trunk of the body. The elastomeric band is incorporated as a resistor in a balanced bridge circuit. Expansion or contraction of the portion of the body on which the elastomeric band is applied causes a change in the resistance of the band and a resultant imbalance of the bridge circuit. The output of the amplifier in volts is suitable for proving the desired reading through a recorder, oscilloscope or voltmeter.

Official Gazette of the U.S. Patent Office

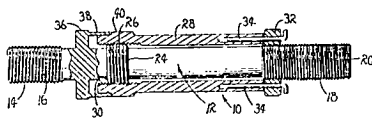


**N74-27865\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.  
**DEVICE FOR MEASURING TENSILE FORCES** Patent  
 Walter T. Appleberry, inventor (to NASA) (McDonnell-Douglas Corp., Huntington Beach, Calif.) Issued 28 Jun. 1974 5 p  
 Filed 21 May 1973 Supersedes N73-25467 (11 - 16, p 1912)  
 Sponsored by NASA

(NASA-Case-MFS-21728-1; US-Patent-3,820,388;  
 US-Patent-Appl-SN-361907; US-Patent-Class-73-141A) Avail:  
 US Patent Office CSCL 14B

This device is characterized by an elongated body having predetermined elastic properties. An applied tensile force of any magnitude, within a given range, imparts to the body an elongation of a predetermined length. The magnitude of applied tensile force is indicated as a function of the angular motion afforded the threaded sleeve mounted on the body.

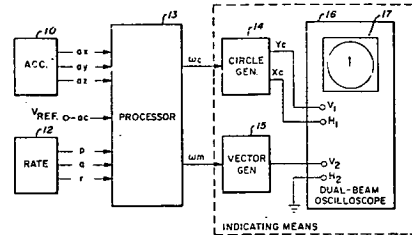
Official Gazette of the U.S. Patent Office



James C. Howard, inventor (to NASA) Issued 12 Jun. 1974 22 p  
 (NASA-Case-ARC-10806; US-Patent-Appl-SN-478802) Avail:  
 NTIS HC \$4.25 CSCL 01D

A g-load measuring apparatus is described for facilitating pilot control of g-load during maneuvering and to provide an indication of g-load constraint violations. The apparatus includes processing means for receiving the components of the linear acceleration and angular velocity of the aircraft and for generating the first output signal indicative of the critical velocity of the aircraft and a second output signal indicative of the instantaneous maneuvering velocity of the aircraft. Indicating means is connected to the processing means for receiving the two output generated signals.

NASA



**N74-27866\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

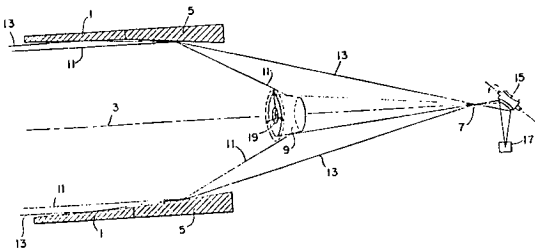
**THREE MIRROR GLANCING INCIDENCE SYSTEM FOR X-RAY TELESCOPE** Patent

Richard B. Hoover, inventor (to NASA) Issued 28 Jun. 1974 5 p Filed 15 Feb. 1972 Supersedes N72-20397 (10 - 11, p 1473)

(NASA-Case-MFS-21372-1; US-Patent-3,821,556;  
 US-Patent-Appl-SN-226477; US-Patent-Class-250-505;  
 US-Patent-Class-250-511) Avail: US Patent Office CSCL 14B

A telescope suitable for soft X-ray astronomical observations consists of a paraboloid section for receiving rays at a grazing angle and a hyperboloid section which receives reflections from the paraboloid at a grazing angle and directs them to a predetermined point of focus. A second hyperboloid section is centrally located from the other two surfaces and positioned to reflect from its outer surface radiation which was not first reflected by the paraboloid. A shutter is included to assist in calibration.

Official Gazette of the U.S. Patent Office



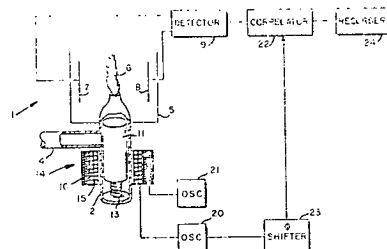
**N74-27875\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**MODULATED HYDROGEN ION FLAME DETECTOR** Patent Application

John Dimeff, inventor (to NASA) Issued 28 Jun. 1974 10 p  
 (NASA-Case-ARC-10322-1; US-Patent-Appl-SN-484209) Avail:  
 NTIS HC \$4.00 CSCL 14B

In a hydrogen flame detector there is provided a means for modulating the density of a gas stream prior to its introduction into the detector flame. A detector, responsive to the resulting modulation of the flame, is provided for producing an output signal having a component fluctuating at the frequency of modulation. A cross-correlator, responsive to the output signal and a signal at the frequency of modulation, is provided for producing a resultant signal proportional to the cross-correlation between its two input signals. A means is further provided for recording or otherwise utilizing the resultant signal thus produced.

NASA



**N74-27872\*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**G-LOAD MEASURING AND INDICATOR APPARATUS** Patent Application

**N74-28932\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

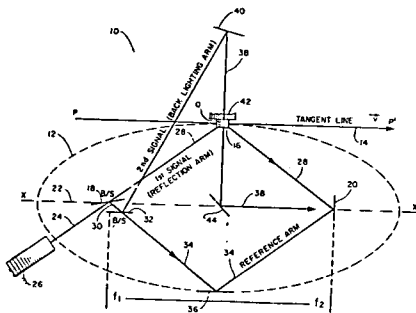
**REAL TIME, LARGE VOLUME, MOVING SCENE HOLOGRAPHIC CAMERA SYSTEM** Patent Application

Robert L. Kurtz, inventor (to NASA) Filed 10 Aug. 1973 33 p

## 14 INSTRUMENTATION AND PHOTOGRAPHY

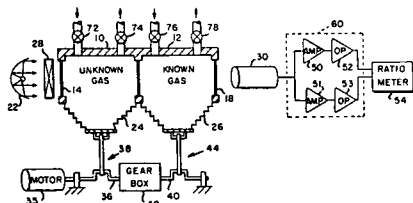
(NASA-CASE-MFS-22537-1; US-Patent-Appl-SN-387266)  
 Avail: NTIS HC \$4.75 CSCL 14E

A holographic motion picture camera system producing resolution of front surface is described. The system utilizes a beam of coherent light and means for dividing the beam into a reference beam for direct transmission to a conventional film transport, and three reflection signal beams for transmission to the film transport by reflection from the three orthogonal sides of a moving scene. The system is arranged so that critical parts are positioned on the foci of three interrelated mathematically derived ellipses. The camera has the theoretical capability of producing motion picture holograms of an object moving at speeds as high as 900,000 cm/sec. Also, the system is capable of handling objects of relatively large volume moving in a random direction anywhere within a volume. NASA



**N74-28933\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.  
**AN NDIR GAS ANALYZER BASED ON ABSORPTION MODULATION RATIOS FOR KNOWN AND UNKNOWN SAMPLES** Patent Application  
 John Dimeff, inventor (to NASA) Filed 28 Jun. 1974 22 p  
 (NASA-CASE-ARC-10802-1; US-Patent-Appl-SN-484208)  
 HC \$4.25 CSCL 14B

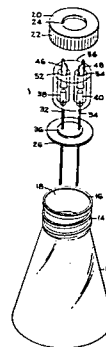
A nondispersive gas analyzer, which is responsive to the fluctuating intensity of radiation passed through a density modulated known and unknown gas sample, is described. As the radiation passes through the gases a signal containing the frequency modulation of the samples is generated. Included in the signal generation is a means for selectively amplifying those components directly related to the frequency of modulation of the known and unknown samples and means for forming a ratio of the components for generating a signal proportional to the density of the known gas in the unknown gas sample. NASA



**N74-29772\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.  
**ELECTRICAL CONDUCTIVITY CELL AND METHOD FOR FABRICATING THE SAME** Patent Application  
 William P. Gilbreath, Michael J. Adamson, and Alex Fassbender,

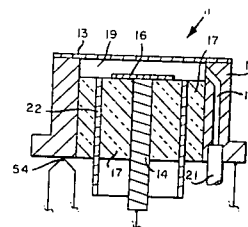
inventors (to NASA) (Foothill Coll.) Issued 16 Jul. 1974 12 p  
 (NASA-Case-ARC-10810-1; US-Patent-Appl-SN-489009) Avail:  
 NTIS HC \$4.00 CSCL 14B

A flask having a threaded neck and a cap adapted for threaded engagement on the neck is described. A laminated disk between the cap and the neck forms a gas tight seal, and the cap has a central opening that exposes a medial region of the disk. Piercing the disk through the opening are two electrodes, the inner ends of which contact the sample within the flask and the outer ends of which afford connection of test equipment. Cylindric glass tubes are fitted over the external portion of the electrodes to provide physical support; silicone rubber or the like serves to retain the glass cylinders in place and form a gas tight seal between the cylinders and the electrodes. Shrinkable tubing is shrunk over the glass tubes to afford further mechanical support and sealing. NASA



**N74-29773\*#** National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.  
**TRIELECTRODE CAPACITIVE PRESSURE TRANSDUCER** Patent Application  
 Grant W. Coon, inventor (to NASA) Issued 31 Jul. 1974 24 p  
 (NASA-Case-ARC-10711-1; US-Patent-Appl-SN-493363) Avail:  
 NTIS HC \$4.25 CSCL 14B

A capacitive transducer and circuit which consists of two capacitive electrodes and a shield electrode, and which is suited for making measurements in a high temperature environment is described. A rise in temperature causes resistance of the insulation between the capacitive electrode to decrease, and the resistive current to attempt to interfere with the capacitive current between the capacitive electrodes. The shield electrode and the circuit coupled to it reduces the resistive current in the transducer. A bridge-type circuit coupled to the transducer ignores the resistive current and measures only the capacitive current flowing between the capacitive electrodes. NASA



**N74-30886\*** National Aeronautics and Space Administration, Goddard Space Flight Center, Greenbelt, Md.  
**STAR SCANNER** Patent  
 Richard L. Gutshall (Ball Bros. Res. Corp.), Randall T. McConaughy (Ball Bros. Res. Corp.), and Frank A. Volpe, inventors (to NASA) Issued 6 Aug. 1974 9 p Filed 29 Sep. 1972 Supersedes

N73-11404 (11 - 02, p 0173)

(NASA-Case-GSC-11569-1; US-Patent-3,827,807;

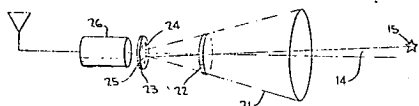
US-Patent-Appl-SN-293725; US-Patent-Class-356-141;

US-Patent-Class-33-268; US-Patent-Class-250-203R;

US-Patent-Class-356-147) Avail: US Patent Office CSCL 20F

A star scanner on a spin stabilized spacecraft is described which includes a reticle with a pair of slits having different separations as a function of the spacecraft vertical plane, to form a V slit. The time between a star image crossing one of the slits relative to a reference telemetry time provides an indication of azimuth angle. The time between the image crossing the two slits provides an indication of elevation angle of the star. If a star cluster is detected such that two stars pass the slits in less time than normally required for a single star to cross the two slits, an indication of the cluster occurrence is derived. Means are provided to prevent effective detection of large celestial bodies, such as the sun or moon.

Official Gazette of the U.S. Patent Office



**N74-30894\*** National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

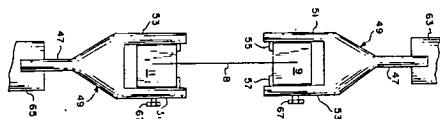
**METHOD AND APPARATUS FOR TENSILE TESTING OF METAL FOIL Patent Application**

Orval W. Wade, inventor (to NASA) (Martin Marietta Corp.) Filed 27 Jun. 1974 14 p Sponsored by NASA

(NASA-Case-LAR-10208-1; US-Patent-Appl-SN-483858) Avail: NTIS HC \$4.00 CSCL 14B

A method is described whereby accurate, reproducible results are obtained in the tensile testing of thin metal foils. The method consists of working the side edges of the test specimen until the edges are parallel and flaw-free, aligning the work specimen between space grip end members, and securing end portions of the aligned test specimen to the grip end members. An aligning apparatus employed in the method consists of an alignment box having a longitudinal bottom wall and two upright side walls with the first and second removable grip end members disposed at each end of the box, and with a means for securing the grip end members within the box. The grip end members are provided with means for receiving opposite end portions and aligning the test specimen.

NASA



**N74-32877\*** National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

**MEASURING PROBE POSITION RECORDER Patent**

Bruce Flagg, inventor (to NASA) Issued 3 Sep. 1974 3 p Filed 12 Jan. 1973 Supersedes N73-15474 (11 - 06, p 0673)

(NASA-Case-LAR-10806-1; US-Patent-3,832,781;

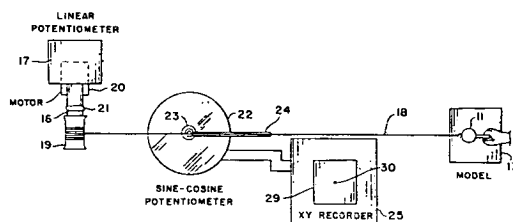
US-Patent-Appl-SN-322998; US-Patent-Class-33-23R;

US-Patent-Class-33-1M; US-Patent-Class-338-89;

US-Patent-Class-340-347AD; US-Patent-Class-346-33R) Avail:

US Patent Office CSCL 14B

A device which enables a person to record the location of measurements made by a hand held nonconducting probe is described. The hand probe is coupled to a linear potentiometer and a sine-cosine potentiometer by means that varies the output of the linear potentiometer proportional to the distance between the hand probe and the linear potentiometer and that varies the output of the sine-cosine potentiometer proportional to the angular movement of the hand probe relative to the sine-cosine potentiometer. The output of the linear potentiometer is applied directly to one input of the sine-cosine potentiometer and is applied through an inverter to the other input or the sine-cosine potentiometer. The cosine and sine outputs of the sine-cosine potentiometer are applied to the X and Y outputs, respectively, of an X-Y recorder. Official Gazette of the U.S. Patent Office



**N74-32878\*** National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

**STAGNATION PRESSURE PROBE Patent**

Michael J. Goodyer, inventor (to NASA) (NAS-NRC) Issued 3 Sep. 1974 6 p Filed 7 Sep. 1972 Supersedes N73-20483 (11 - 11, p 1292) Sponsored by NASA

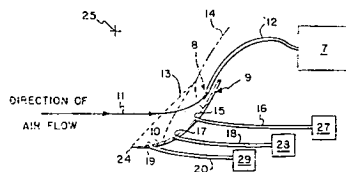
(NASA-Case-LAR-11139-1; US-Patent-3,832,903;

US-Patent-Appl-SN-287149; US-Patent-Class-73-388;

US-Patent-Class-73-182) Avail: US Patent Office CSCL 14B

A method and apparatus for measuring the stagnation pressure of supersonic velocity gas streams without the generation of shock waves which interfere with such measurements are given. The technique is insensitive to the type of gas and Mach number and is therefore particularly useful in the study of jet engine exhausts.

Official Gazette of the U.S. Patent Office



## 14 INSTRUMENTATION AND PHOTOGRAPHY

**N74-32879\*** National Aeronautics and Space Administration.  
Lyndon B. Johnson Space Center, Houston, Tex.

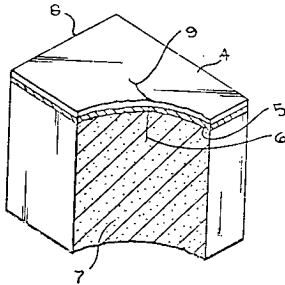
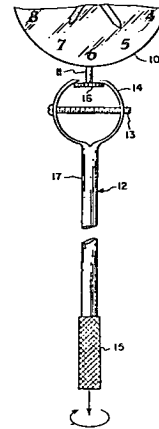
### METHOD AND DEVICE FOR DETECTION OF SURFACE DISCONTINUITIES OR DEFECTS Patent

Lubert J. Leger, inventor (to NASA) Issued 20 Aug. 1974  
22 p Filed 24 Jan. 1973 Supersedes N73-17564 (11 - 08,  
p 0923)

(NASA-Case-MSC-14187-1; US-Patent-3,830,094;  
US-Patent-Appl-SN-326326; US-Patent-Class-73-15.4;  
US-Patent-Class-73-40.7; US-Patent-Class-73-104;  
US-Patent-Class-23-230L) Avail: US Patent Office CSCL  
14B

Surface discontinuities of defects such as cracks and orifices are detected by applying a penetrating fluid, preferably a liquid, to a test surface so as to cause the liquid to penetrate any minute cracks or opening in the surface, removing the excess liquid from the surface, and leaving a residual in the discontinuities, cavities, or in the subsurface materials. A sheet of porous material impregnated with a sensitizing medium which will react with vapors of the residual liquid to form a visible pattern is applied to the test surface. The residual liquid trapped in the discontinuities, cavities, or subsurface material is vaporized, and, as the vapors contact the sensitizing medium on the sheet, a pattern corresponding to the discontinuity is formed on the sheet material and the penetrant completely removed from the sample.

Official Gazette of the U.S. Patent Office



**N74-32883\*#** National Aeronautics and Space Administration.  
Lyndon B. Johnson Space Center, Houston, Tex.

### COSMIC DUST ANALYZER Patent Application

Neal L. Roy, inventor (to NASA) (TRW Systems Group) Filed  
31 May 1974 41 p  
(Contract NAS9-9309)

(NASA-Case-MSC-13802-2; US-Patent-Appl-SN-475338) Avail:  
NTIS HC \$5.25 CSCL 14B

Methods and apparatus are provided which employ ion time-of-flight techniques to determine the constituency of a high velocity particle of matter such as a micrometeorite. A charged target electrode is arranged to intercept the particle, the impact of which will create a discrete cloud or plasma of ions of both the target material as well as the particle matter. A charged collector electrode is spaced a preselected distance from the target electrode to receive the ions. However, the region between the two electrodes is established as a low density field-free region, and if the ions are then accelerated into the collector electrode at a proper body, the ions in the plasma will tend to travel at a velocity which is substantially a function of only the mass of the ion. Accordingly, the ions in the plasma will tend to separate into groups according to mass, and since each group of ions can be counted as well as identified as to mass, the ions of target material can be separated from the measurement.

NASA

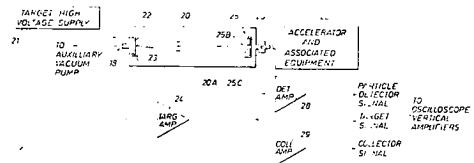
**N74-32882\*#** National Aeronautics and Space Administration.  
Langley Research Center, Langley Station, Va.

### CLOCK SETTER Patent Application

Claude T. Haley, inventor (to NASA) Filed 9 Sep. 1974 7 p  
(NASA-Case-LAR-11458-1; US-Patent-Appl-SN-504225) Avail:  
NTIS HC \$4.00 CSCL 14B

An apparatus for manually adjusting large wall-mounted clocks, while the operator stands on the floor, is discussed. The device consists of a long handled tool which slips over the reset knob of the clock allowing a downward and twisting motion to adjust the indicated time. A diagram of the device is provided.

NASA



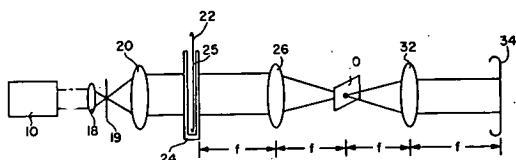
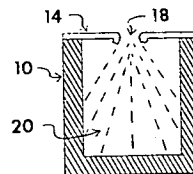
**N74-32884\***# National Aeronautics and Space Administration.  
Lyndon B. Johnson Space Center, Houston, Tex.

**PHOTOGRAPHIC FILM RESTORATION SYSTEM Patent Application**

Joseph L. Horner, inventor (to NASA) Filed 8 Feb. 1974  
14 p

(NASA-Case-MSC-12448-2; US-Patent-Appl-SN-440918) Avail:  
NTIS HC \$4.00 CSCL 14E

A color photographic film restoration system is described. The system is comprised of a source of coherent light illuminating an exposed film with a degraded image, a Fourier transform lens behind the exposed film, a spatial filter behind the transform lens, another Fourier transform lens behind the spatial filter, and an unexposed color film for recording a corrected representation of the degraded color image on the unexposed film. A total optical system is disclosed in which the spatial filter may comprise a photographic film whose transmittance characteristics restores the ratio of the zero to the higher spatial frequency components of image produced by the system. An opto-electronic system is also disclosed in which the spatial filter is a part of a digital computer. NASA



**N74-32886\***# National Aeronautics and Space Administration.  
Goddard Space Flight Center, Greenbelt, Md.

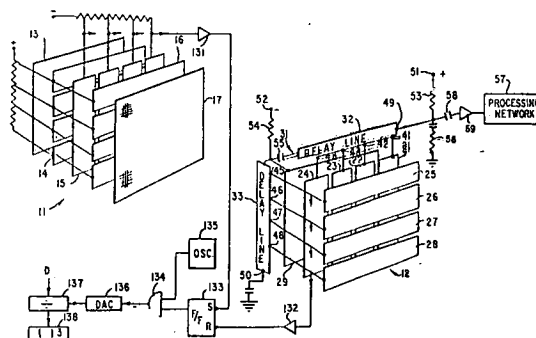
**IMPACT POSITION DETECTOR FOR OUTER SPACE PARTICLES Patent Application**

Siegfried O. Auer, inventor (to NASA) (NAS-NRC), Filed 30 Aug. 1974 31 p

(Contract NSR-09-01-087)

(NASA-Case-GSC-11829-1; US-Patent-Appl-SN-502136) Avail:  
NTIS HC \$4.75 CSCL 14B

The impact position of cosmic dust, micrometeoroids, and other similar outer space particles was detected with an array including a multiplicity of mutually insulated, metal electrode strips, a first group of which has parallel, longitudinal axes at right angles to a second group of the strips. A delay line which has a multiplicity of taps, each of which is connected to one of the strips is provided. The delay times between adjacent tapes of the delay line are approximately the same. One end of the delay line is terminated with a resistor having a value substantially equal to the characteristic impedance of the delay line. The arrival time at a delay line output terminal of pulses induced in the delay line in response to particle impact is determined relative to the occurrence time of a further pulse derived in response to the impact. Circuitry is provided to separate pulses induced in the line from different strips, even though there are substantially simultaneous impacts on the different strips. NASA



**N74-32885\***# National Aeronautics and Space Administration.  
Lyndon B. Johnson Space Center, Houston, Tex.

**SPACEFLIGHT METEOROID COMPOSITION EXPERIMENT Patent Application**

Herbert A. Zook and Richard W. High, inventors (to NASA) Filed 5 Mar. 1974 11 p

(NASA-Case-MSC-12423-1; US-Patent-Appl-SN-448320) Avail:  
NTIS HC \$4.00 CSCL 14B

A device for capturing, in space, meteoroid particles which are uncontaminated by the capture environment is described. The capture cell is a cube or other shaped cell of very pure material. The cell has one open side over which is fixed a thin membrane. An array of these cells is exposed to the space environment where it is eventually struck by a meteoroid. The particles of the meteoroid penetrate the membrane and are imbedded in the walls of the cell. NASA

## 14 INSTRUMENTATION AND PHOTOGRAPHY

**N74-32887\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### MOVING PARTICLE COMPOSITION ANALYZER Patent Application

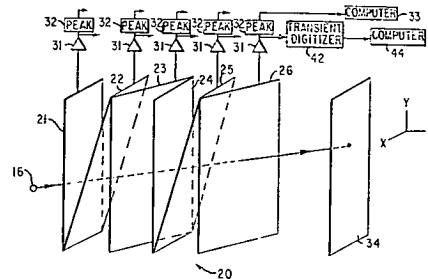
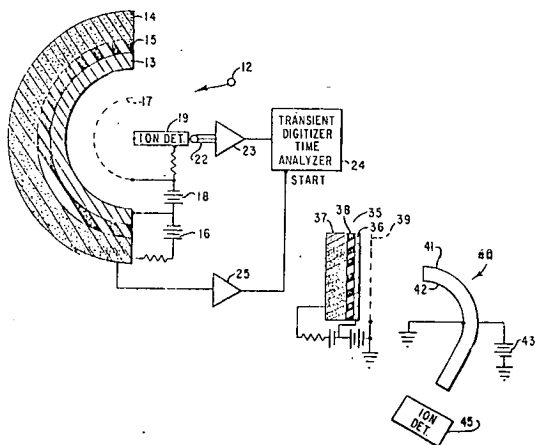
Siegfried O. Auer, inventor (to NASA) (NAS-NRC) Filed 30 Aug. 1974 19 p

(Contract NSR-09-01-087)

(NASA-Case-GSC-11889-1; US-Patent-Appl-SN-502124) Avail: NTIS HC \$4.00 CSCL 14B

Mass spectrometry apparatus for analyzing the composition of moving microscopic particles is presented. The apparatus includes a capacitor with a front electrode upon which the particles impinge, a back electrode, and a solid dielectric sandwiched between the front and back electrodes. The electrodes and dielectric are arcuately shaped as concentric peripheral segments of different spheres having a common center and different radii. The front electrode and dielectric together have a thickness such that an impinging particle can penetrate them. The front electrode is negatively biased relative to the back electrode so that an impinging particle causes the front and back electrodes to become electrically connected to form a discharge spark between the electrodes. The discharge spark causes ejection from the front electrode of positive ions of elements in the impinging particle. Arrival times of different ions are measured to complete the analysis.

NASA



**N74-32890\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

### ION AND ELECTRON DETECTOR FOR USE IN AN ICR SPECTROMETER Patent Application

Wesley T. Huntress, inventor (to NASA) (JPL) Filed 27 Aug. 1974 19 p

(Contract NAS7-100)

(NASA-Case-NPO-13479-1; US-Patent-Appl-SN-500981) Avail: NTIS HC \$4.00 CSCL 14B

A detector for detecting ions and/or electrons present in a resonance cell of an ion cyclotron resonance spectrometer is discussed. The detector, which operates on the Q-meter principle, is driven by an external radio frequency oscillator capable of providing radio frequencies up to about 15 MHz at an adjustable low radio frequency signal level. The detector is connected across the resonance of the cell to detect ions by their cyclotron frequency. Electrons are detectable by connecting the detector across the cell's trapping plates which detects the motion of the electrons, the frequency of which is in the megahertz range.

NASA

**N74-32888\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### MICROMETEOROID VELOCITY AND TRAJECTORY ANALYZER Patent Application

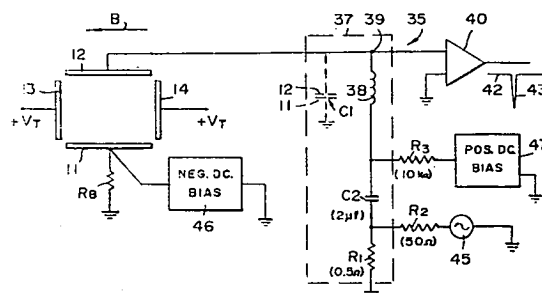
Siegfried O. Auer, inventor (to NASA) (NAS-NRC) Filed 30 Aug. 1974 24 p

(Contract NSR-09-01-087)

(NASA-Case-GSC-11892-1; US-Patent-Appl-SN-502135) Avail: NTIS HC \$4.25 CSCL 14B

Movement of a charged particle through a region is detected by providing a detector including first, second and third spaced metal grids pervious to the particle and positioned so that the particles passes through them in sequence. The first and third grids are short-circuited to each other and to ground. A signal input terminal of a dc amplifier is connected in dc circuit with the second grid so that a voltage pulse induced in the second grid by the particle passing through the three results in an output pulse of the amplifier. A plurality of such detectors are arranged for enabling the position and velocity vectors of the charged particle to be detected in three mutually orthogonal axes, X, Y and Z.

NASA

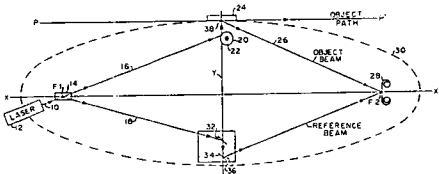


**N74-33943\*\*** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**A HOLOGRAPHIC MOTION PICTURE CAMERA Patent Application**

Robert L. Kurtz, inventor (to NASA) Filed 17 Sep. 1974 13 p (NASA-Case-MFS-22517-1; US-Patent-Appl-SN-506804) Avail: NTIS HC \$4.00 CSCL 14E

A holographic motion picture camera for producing three dimensional images was disclosed. The camera employs an elliptical optical system and a motion compensator is present in one of the beam paths; the compensator allows the camera to photograph fast moving objects. NASA



**N74-33944\*\*** National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

**HALL EFFECT MAGNETOMETER Patent Application**

John A. Woollam, Harry A. Beale (Md. Univ.), and Ian L. Spain, inventors (to NASA) (Md. Univ.) Filed 13 Dec. 1973 8 p (NASA-Case-LEW-11632-3; US-Patent-Appl-SN-424590) Avail: NTIS HC \$4.00 CSCL 14B

A magnetometer utilizing a single crystal of Bi<sub>2</sub>Se<sub>3</sub> having a rhombohedral crystal structure is described along with a method for making such a device. The Bi<sub>2</sub>Se<sub>3</sub> has a positive or negative Hall coefficient and a carrier concentration of about 10 to the 18th power to 10 to the 20th power per cubic centimeter. NASA

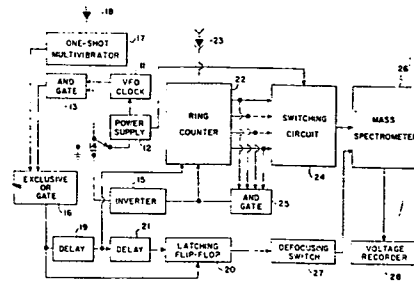
**N74-34857\*** National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

**FAST SCAN CONTROL FOR DEFLECTION TYPE MASS SPECTROMETERS Patent**

Paul R. Yeager, Gianni Gaetano, and David B. Hughes, inventors (to NASA) (Bell and Howell Co., Pasadena, Calif.) Issued 10 Sep. 1974 7 p Filed 4 May 1973 Continuation-in-part of abandoned US Patent Appl. SN-188836, filed 31 Oct. 1971 (NASA-Case-LAR-11428-1; US-Patent-3,835,318; US-Patent-Appl-SN-357126; US-Patent-Class-250-281; US-Patent-Class-250-295; US-Patent-Appl-SN-188836) Avail: US Patent Office CSCL 14B

A high speed scan device is reported that allows most any scanning sector mass spectrometer to measure preselected gases at a very high sampling rate. The device generates a rapidly changing staircase output which is applied to the accelerator of the spectrometer and it also generates defocusing pulses that are applied to one of the deflecting plates of the spectrometer which when shorted to ground deflects the ion beam away from the collector. A defocusing pulse occurs each time there is a change in the staircase output.

Official Gazette of the U.S. Patent Office



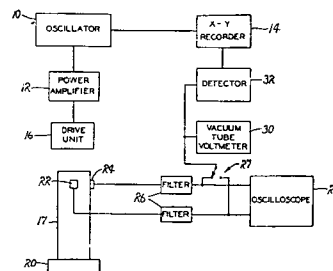
**N74-34860\*\*** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**METHOD AND APPARATUS FOR DETECTING FLAWS IN ELONGATED BODIES Patent Application**

Otto Buck (Rockwell Intern.), Richard V. Inman (Rockwell Intern.), George A. Alers (Rockwell Intern.), and Harris L. Marcus, inventors (to NASA) (Rockwell Intern.) Filed 24 Sep. 1974 13 p Sponsored by NASA

(NASA-Case-MFS-19218-1; US-Patent-Appl-SN-508803) Avail: NTIS HC \$4.00 CSCL 14B

A nondestructive method and apparatus for use in detecting flaws in elongated bodies such as bars, tubes, and the like. The embodying method, and the apparatus provided for performing the method, facilitate flaw detection. This occurs through: (1) applying an axially directed oscillating magnetic force to the free end of a body being tested, (2) for exciting in the body a resonant vibration, (3) electrically sensing the vibration at two orthogonally related points near the free end of the body, and (4) comparing resultant electrical signals for revealing the presence of flaws. NASA



**N74-34861\*\*** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**RAPID ACTIVATION AND CHECKOUT DEVICE FOR BATTERIES Patent Application**

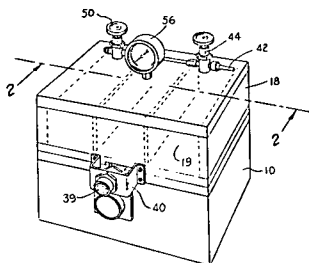
William J. Britz and William A. Boshers, inventors (to NASA) Filed 27 Jun. 1974 13 p

(NASA-Case-MFS-22749-1; US-Patent-Appl-SN-483857) Avail: NTIS HC \$4.00 CSCL 14B

An apparatus is described for activating a battery by inserting

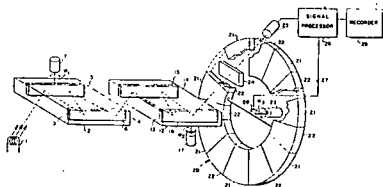


an electrolyte in the cells while making voltage measurements on each cell. The battery has a planar top with vertically extending passages providing access to the cells. It also has test points adjacent to each cell. A housing is mounted on top of the battery for supplying an electrolyte through sealed passages into the cells while simultaneously checking the voltage of the cells. The electrolyte is forced by pressure into the battery. NASA



**A METHOD AND APPARATUS FOR COMPENSATING  
REFLECTION LOSSES IN A PATH LENGTH MODULATED  
ABSORPTION-ABSORPTION TRACE GAS DETECTOR**  
Patent Application

A method and apparatus is described for compensating for reflection losses in an optical path length modulated absorption-absorption gas analyzer used for determining the density of a reference gas in an unknown gas sample. The apparatus comprises a first chamber for containing a first gas including a reference gas at a known partial density and a second chamber for containing a second gas. A source of radiant energy is provided for passing radiant energy through the first and second chambers. Means are provided for modulating the path length of the radiant energy in the chambers. Additionally, a chopper wheel comprising a plurality of gas cells containing a sample of the reference gas is interspersed by a plurality of gas cells containing a gas excluding the reference gas.



## 15 MACHINE ELEMENTS AND PROCESSES

Includes bearings, seals, pumps, and other mechanical equipment; lubrication, friction, and wear; manufacturing processes and quality control; reliability; drafting; and materials fabrication, handling, and inspection.

**N74-22136\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### AIRLOCK Patent

Hal R. Linderfelt, inventor (to NASA) (McDonnell-Douglas Corp., Huntington Beach, Calif.) Issued 30 Apr. 1974 20 p Filed 24 Jan. 1972 Sponsored by NASA

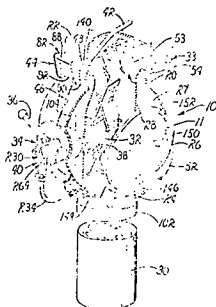
(NASA-Case-MFS-20922-1; US-Patent-3,807,656;

US-Patent-Appl-SN-220274; US-Patent-Class-244-1SS;

US-Patent-Class-49-68; US-Patent-Class-61-83) Avail: US Patent Office CSCL 13G

An airlock for use in transferring waste objects from a positively pressurized enclosure aboard an operative space vehicle, to a waste receiver attached to the vehicle and maintained at the negative pressure of a celestial space environment. The airlock is characterized by a shell having an internal chamber and hermetically sealed within an opening formed in a bulkhead of the enclosure. The shell is provided with an insertion hatch adjacent to the enclosure, and an ejection hatch adjacent the waste receiver, each of the hatches being hermetically sealed by a hatch cover supported for deployment to a hatch-opening disposition through a manipulation of a hatch-deploying mechanism. A three-way selector valve is coupled with the deploying mechanism and ported to an internal chamber of the shell, the enclosure, and the environment and is provided for alternately coupling the chamber with the enclosure and the receiver, in direct communication, in response to a manipulation of the mechanism whereby a sequence is imposed on the operation of the airlock.

Official Gazette of the U.S. Patent Office



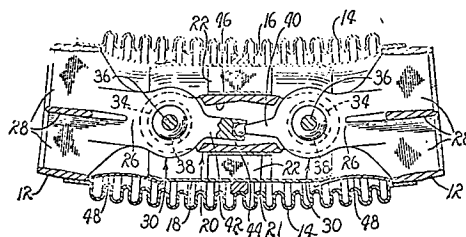
**N74-22145\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### AN INTERNALLY SUPPORTED FLEXIBLE DUCT JOINT Patent Application

Ralph F. Kuhn, Jr., inventor (to NASA) (Rocketdyne) Filed 16 Apr. 1974 14 p Sponsored by NASA

(NASA-Case-MFS-19193-1; US-Patent-Appl-SN-461477) Avail: NTIS HC \$4.00 CSCL 13G

The development of an internally supported flexible duct for conducting fluids under high pressures in systems where relatively large deflection angles must be accommodated is discussed. The device is based on coaxially aligned bellows assemblies to provide flexibility with high internal pressures. Diagrams of the invention are provided and specific applications are proposed. P.N.F.



**N74-22146\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

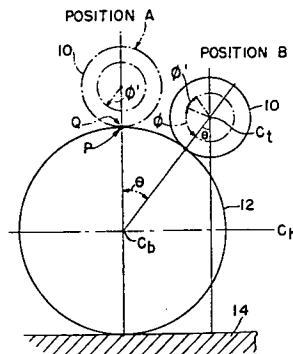
### ANTI-GRAVITY DEVICE Patent Application

Sudarshan Pal Singh, inventor (to NASA) (NAS-NRC) Filed 22 Apr. 1974 11 p Sponsored by NASA

(NASA-Case-MFS-22758-1; US-Patent-Appl-SN-462706) Avail: NTIS HC \$4.00 CSCL 20K

A device for demonstrating the effects of gravity was developed. The device consists of two spheres of different radii, a small sphere resting on top of a larger one. The center of gravity of the small sphere is located below its geometric center. When the small sphere is rolled without slippage on the surface of the large sphere and then released, the small sphere will resume its original position, thus seeming to defy the law of gravity. The desired results will only be obtained if the small sphere is moved through an angle of less than 30 degrees.

P.N.F.



## 15 MACHINE ELEMENTS AND PROCESSES

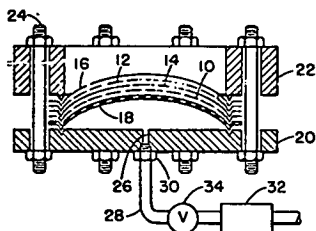
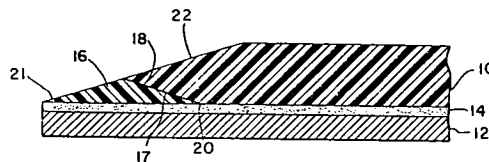
**N74-22147\*** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

### APPARATUS FOR FORMING DISHED ION THRUSTER GRIDS Patent Application

Bruce A. Banks, inventor (to NASA) Filed 22 Apr. 1974  
11 p

(NASA-Case-LEW-11694-2; US-Patent-Appl-SN-462903) Avail:  
NTIS HC \$4.00 CSCL 13I

The invention of an apparatus for forming matched pairs of dished grids having a high percentage of open areas for ion thruster accelerator systems is discussed. All the blanks and sheets are dished simultaneously by forcing fluid to inflate an elastic sheet which causes the desired degree of distortion. The dished grids are also stress relieved simultaneously. Diagrams of the forming device are provided. NASA



**N74-23065\*** National Aeronautics and Space Administration.  
Pasadena Office, Calif.

### SCANNING NOZZLE PLATING SYSTEM Patent

Gerald D. Oliver, inventor (to NASA) (JPL) Issued 14 May  
1974 4 p. Filed 28 Jun. 1972 Supersedes N72-28507 (10 -  
19, p 2570) Sponsored by NASA

(NASA-Case-NPO-11758-1; US-Patent-3,810,829;  
US-Patent-Appl-SN-266913; US-Patent-Class-204-222) Avail:  
US Patent Office CSCL 13H

A plating system is described in which a substrate to be plated is supported on a stationary platform. A nozzle assembly with a small nozzle is supplied with a plating solution under high pressure, so that a constant-flow stream of solution is directed to the substrate. The nozzle assembly is moved relative to the substrate at a selected rate and movement pattern. A potential difference (voltage) is provided between the substrate and the solution in the assembly. The voltage amplitude is modulated so that only when the amplitude is above a minimum known value plating takes place.

Official Gazette of the U.S. Patent Office

**N74-23064\*** National Aeronautics and Space Administration.  
Langley Research Center, Langley Station, Va.

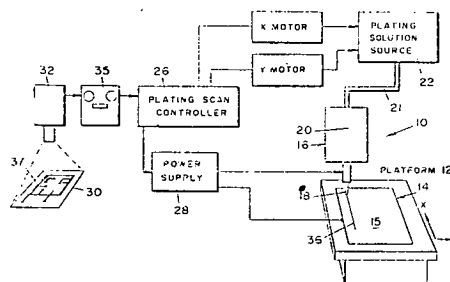
### BONDED JOINT AND METHOD Patent

John B. Sainsbury-Carter, inventor (to NASA) (United Aircraft  
Corp., Stratford Conn.) Issued 7 May 1974 3 p. Filed 18 Sep.  
1972 Supersedes N73-10499 (11 - 01, p 0061) Sponsored  
by NASA

(NASA-Case-LAR-10900-1; US-Patent-3,809,601;  
US-Patent-Appl-SN-290021; US-Patent-Class-161-116) Avail:  
US Patent Office CSCL 13H

An improved joint is described for reducing the peak shear stress in adhesive bonds when adhesives are used to bond two materials which are in a lapped relationship and which differ in value of modulus of elasticity. An insert placed between the adhesive and one of the two materials acts to cushion the discontinuity of material stiffness thereby reducing the peak shear stress in the adhesive bond.

Official Gazette of the U.S. Patent Office

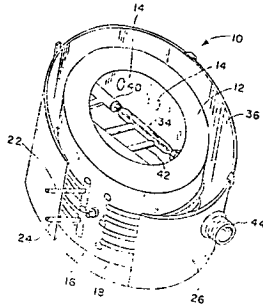
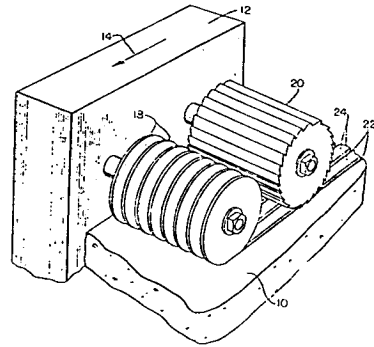


**N74-23066\*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.  
**LIGHT SHIELD AND COOLING APPARATUS Patent**  
 Thomas G. Meador, Jr., inventor (to NASA) Issued 14 May 1974 4 p Filed 10 Nov. 1972 Supersedes N73-13474 (11 - 04, p 0426)

(NASA-Case-LAR-10089-1; US-Patent-3,811,044;  
 US-Patent-Appl-SN-305638; US-Patent-Class-240-47;  
 US-Patent-Class-353-54; US-Patent-Class-353-61) Avail:  
 US Patent Office CSCL 20F

A light shield and cooling apparatus was developed for a high intensity ultraviolet lamp including water and high pressure air for cooling and additional apparatus for shielding the light and suppressing the high pressure air noise.

Official Gazette of the U.S. Patent Office



**N74-23069\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

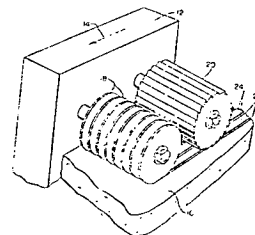
**ROCK SAMPLING Patent**

Philip Blum, inventor (to NASA) (Natl. Res. Corp., Cambridge, Mass.) Issued 12 Oct. 1971 6 p Filed 11 Sep. 1969 Continuation-in-part of abandoned US Patent Appl. SN-611414, filed 24 Jan. 1967 Sponsored by NASA Prepared for JPL

(NASA-Case-XNP-09755; US-Patent-3,612,030;  
 US-Patent-Appl-SN-857241; US-Patent-Class-125-1;  
 US-Patent-Class-125-3; US-Patent-Class-299-86;  
 US-Patent-Class-51-283; US-Patent-Appl-SN-611414) Avail:  
 US Patent Office CSCL 13I

A method for sampling rock and other brittle materials and for controlling resultant particle sizes is described. The method involves cutting grooves in the rock surface to provide a grouping of parallel ridges and subsequently machining the ridges to provide a powder specimen. The machining step may comprise milling, drilling, lathe cutting or the like; but a planing step is advantageous. Control of the particle size distribution is effected primarily by changing the height and width of these ridges. This control exceeds that obtainable by conventional grinding.

Official Gazette of the U.S. Patent Office



**N74-23068\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**ROCK SAMPLING Patent**

Philip Blum, inventor (to NASA) (Natl. Res. Corp., Cambridge, Mass.) Issued 20 Sep. 1971 4 p Filed 6 Aug. 1968 Continuation-in-part of US Patent Appl. SN-611414, filed 24 Jan. 1967 Sponsored by NASA Prepared for JPL

(NASA-Case-XNP-10007-1; US-Patent-3,606,470;  
 US-Patent-Appl-SN-768942; US-Patent-Class-299-67;  
 US-Patent-Appl-SN-611414) Avail: US Patent Office CSCL 13I

An apparatus for sampling rock and other brittle materials and for controlling resultant particle sizes is described. The device includes grinding means for cutting grooves in the rock surface and to provide a grouping of thin, shallow, parallel ridges and cutter means to reduce these ridges to a powder specimen. Collection means is provided for the powder. The invention relates to rock grinding and particularly to the sampling of rock specimens with good size control.

Official Gazette of the U.S. Patent Office

## 15 MACHINE ELEMENTS AND PROCESSES

**N74-23070\*** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

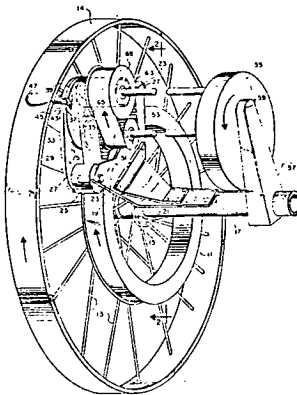
### **TWO SPEED DRIVE SYSTEM Patent**

John L. Burch, inventor (to NASA) Issued 25 Jul. 1972 6 p  
Filed 31 Dec. 1970 Supersedes N72-20463 (10 - 11, p 1481)

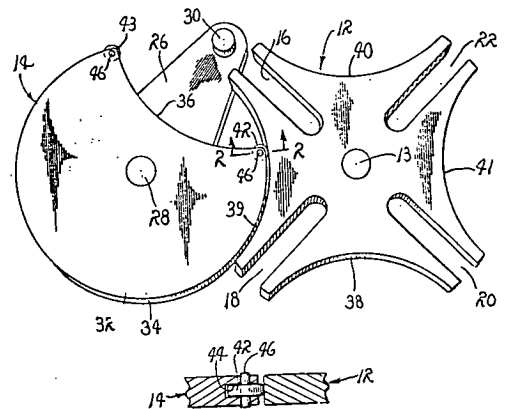
(NASA-Case-MFS-20645-1; US-Patent-3,678,771;

US-Patent-Appl-SN-103091; US-Patent-Class-74-217R) Avail:  
US Patent Office CSCL 131

A two speed drive system for a wheel of a vehicle by which shifting from one speed to the other is accomplished by the inherent mechanism of the wheel is described. A description of the speed shifting operation is provided and diagrams of the mechanism are included. Possible application to lunar roving vehicles is proposed. P.N.F.



which a rolling engagement is established between the cam and the star-wheel. By including antifriction rollers at the opposite ends of the excurved segment of the restraining cam, freezing of the star-wheel to the restraining cam is precluded. NASA



**N74-25968\*** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

### **INSERT FACING TOOL Patent**

William J. Abernathy and Lowell G. Snoddy, inventors (to NASA) Issued 28 May 1974 4 p Filed 2 Aug. 1972 Supersedes N72-31490 (10 - 22, p 2971)

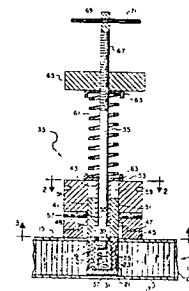
(NASA-Case-MFS-21485-1; US-Patent-3,813,183;

US-Patent-Appl-SN-277436; US-Patent-Class-408-80;

US-Patent-Class-408-111; US-Patent-Class-90-12.5) Avail:  
US Patent Office CSCL 131

A manually actuated tool for facing the exposed end of an insert installed in a honeycomb panel is described. Several cutting bits are held in a round body portion that is rotated around the end of a stud to provide the cutting action. Pressure is adjusted through a spring against the body portion and the surface of the stud by a pressure nut threaded on the stud. A diagram of the components of the device is provided.

Official Gazette of the U.S. Patent Office



**N74-23071\*#** National Aeronautics and Space Administration, Pasadena Office, Calif.

### **AN IMPROVED GENEVA MECHANISM Patent Application**

Robert H. Summers (JPL) and Ralph L. Kenney, inventors (to NASA) (JPL) Filed 2 Nov. 1973 16 p  
(Contract NAS7-100)

(NASA-Case-NPO-13281-1; US-Patent-Appl-SN-412079) Avail:  
NTIS HC \$4.00 CSCL 131

The invention is characterized by a driven star-wheel mounted on a shaft in contiguous relation with a restraining cam of a star-wheel driver. The star-wheel includes several radially extended slots separated by a segmented cam follower surface, including uniform incurved segments. The incurved surfaces of the star-wheel are sequentially engaged by an excurved segment of the surface of the restraining cam. A pair of antifriction rollers are mounted at each end of the excurved cam surface through

**N74-25971\*** National Aeronautics and Space Administration, Pasadena Office, Calif.

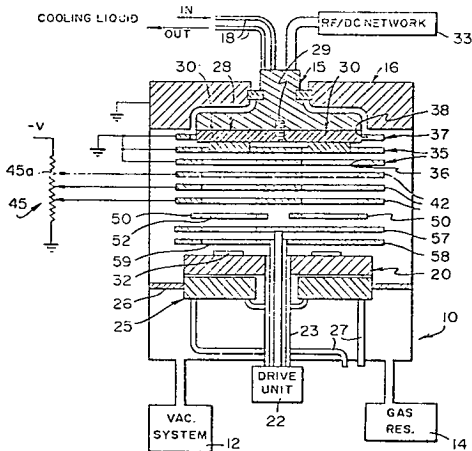
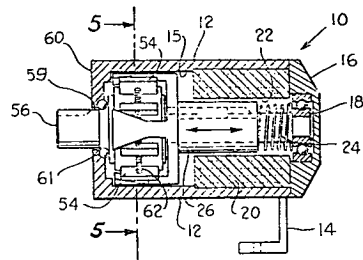
**A MULTITARGET SEQUENTIAL SPUTTERING APPARATUS Patent Application**

Rindge Shima, inventor (to NASA) (JPL) Issued 22 Apr. 1974 22 p

(Contract NAS7-100)

(NASA-Case-NPO-13345-1; US-Patent-Appl-SN-462705) Avail: NTIS HC \$4.25 CSCL 13H

A sputtering apparatus includes a single cathode on which a plurality of targets of different materials are supported, with a rotatable anode, supporting a substrate and/or substrates, spaced apart from the cathode in a chamber containing an inert gas at a selected pressure. A potential difference is applied between the cathode and anode to produce a plasma for each target, which is sputtered by accelerated ions within the plasma. Apertured plates and shields are positioned between the targets and the anode to effectively separate the plasmas into separate columns. The sputtered material from each target having access to the substrate/substrates only through that target's column. NASA



**N74-26977\*** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**DEVICE FOR CONFIGURING MULTIPLE LEADS Patent**

Paul W. Clemens, inventor (to NASA) (Sperry Rand Corp., Huntsville, Ala.) Issued 11 Jun. 1974 7 p Filed 2 Mar. 1973 Sponsored by NASA

(NASA-Case-MFS-22133-1; US-Patent-3,815,205;

US-Patent-Appl-SN-337487; US-Patent-Class-29-203MW)

Avail: US Patent Office CSCL 13I

A device for simultaneously configuring multiple leads projected from a printed circuit affixed to a circuit board is described. The device is characterized by a receptacle adapted to receive and support a circuit board having multiple leads, a first locking mechanism for securing the base portion of the leads against motion relative to the circuit board, and a second locking mechanism, spaced from the receptacle and mounted on a carriage for securing the distal end portions of the leads relative to the carriage. The carriage, in turn, is supported for a simultaneous motion in vertical and horizontal planes for imparting selective motion to the carriage, so that leads secured by the locking mechanisms are deformed to a preselected configuration. Official Gazette of the U.S. Patent Office

**N74-26976\*** National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Ala.

**SPRAG SOLENOID BRAKE Patent**

Dan H. Dane, inventor (to NASA) Issued 28 May 1974 5 p Filed 14 May 1973 Supersedes N73-23552 (11 - 14, p 1670)

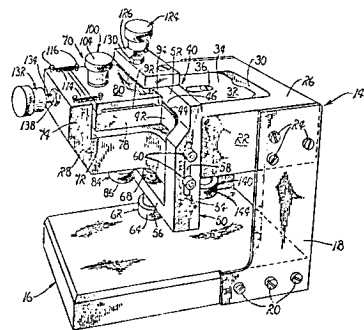
(NASA-Case-MFS-21846-1; US-Patent-3,812,936;

US-Patent-Appl-SN-359958; US-Patent-Class-188-171;

US-Patent-Class-188-163) Avail: US Patent Office CSCL 13I

The development and characteristics of an electrically operated brake are discussed. The action of the brake depends on energizing a solenoid which causes internally spaced sprockets to contact the inner surface of the housing. A spring forces the control member to move to the braking position when the electrical function is interrupted. A diagram of the device is provided and detailed operating principles are explained.

Official Gazette of the U.S. Patent Office



## 15 MACHINE ELEMENTS AND PROCESSES

**N74-26988\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

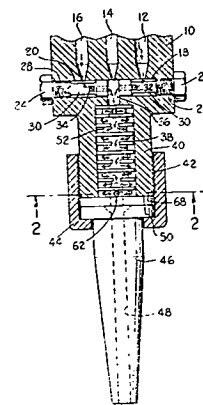
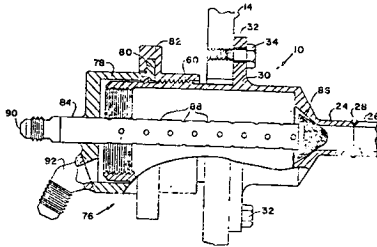
### **QUICK DISCONNECT FILTER COUPLING Patent Application**

Fred Jankowski, inventor (to NASA) Issued 30 May 1974 13 p

(NASA-Case-MFS-22323-1; US-Patent-Appl-SN-474745) Avail: NTIS HC \$4.00 CSCL 13E

The invention relates to a quick disconnect filter coupling for use in coupling a pair of lines together through which fluid passes. The device is particularly applicable in the space shuttle program wherein prior to re-using the space shuttle couplings utilized in fueling the launching the space shuttle must be cleaned for removing all contaminants therefrom. The quick disconnect filter coupling includes a male portion which is normally mounted on the skin of a missile adapted to receive a female portion. Within the male portion is a removable filter cartridge. The filter cartridge includes a check valve and a filter medium. Normally, before the coupling is re-used a purge assembly, is utilized for cleaning contaminants from the coupling device. The novelty of the invention appears to lie in providing a quick disconnect filter coupling which has a filter assembly that can be readily removed and a purging device coupled thereto for cleaning contaminants therefrom.

NASA



**N74-27900\*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

### **APPARATUS FOR INSERTING AND REMOVING SPECIMENS FROM HIGH TEMPERATURE VACUUM FURNACES Patent**

Charles W. Whitehead, inventor (to NASA) Issued 18 Jun. 1974 5 p Filed 17 Nov. 1972 Supersedes N73-12494 (11 - 05, p 0305)

(NASA-Case-LAR-10841-1; US-Patent-3,817,084;

US-Patent-Appl-SN-307729; US-Patent-Class-73-15R;

US-Patent-Class-13-31) Avail: US Patent Office CSCL 14B

The apparatus comprises a high speed gate valve for isolating the interior of the furnace from an air lock chamber on the opposite side of the gate valve. The air lock chamber is provided with valve ports connected to a vacuum source, a source of inert quenching gas, and the atmosphere, respectively. Attached to the end of the air lock chamber away from the furnace is a cylindrical tube having disposed within it a rod carrying specimen pan at the end towards the furnace and having mounted at its top end an annular magnet having a diameter slightly less than the interior diameter of the tube. The top end of the tube is closed by a removable cap. Encircling the tube in the vicinity of the magnet is a carbon steel ring which when axially moved along the tube causes the magnet to follow it and thereby controls the position of the rod and specimen pan within the tube.

Official Gazette of the U.S. Patent Office

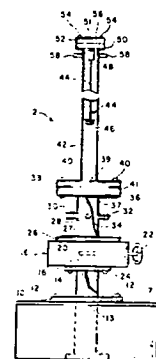
**N74-26989\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### **MIXING INSERT FOR FOAM DISPENSING APPARATUS Patent Application**

William G. Simpson, inventor (to NASA) Issued 12 Jun. 1974 11 p

(NASA-Case-MFS-20607-1; US-Patent-Appl-SN-478800) Avail: NTIS HC \$4.00 CSCL 13I

The design and operation of a device for mixing foam are described. The device may be used anywhere that ingredients are mixed and dispensed through a nozzle. One particular application is in dispensing polyurethane foam. The construction of the equipment is illustrated. The novelty of the equipment lies in the feature of forcing the ingredients through one side of the housing to the other as they flow through slots of alternate discs with the ingredients being divided and recombined. NASA



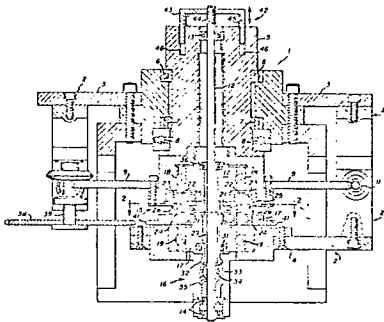
**N74-27901\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**CONCENTRIC DIFFERENTIAL GEARING ARRANGEMENT**  
**Patent**

Robert J. Zeiger and John C. Gerds, inventors (to NASA) Issued 25 Jun. 1974 5 p Filed 29 Nov. 1972 Supersedes N73-29459 (11 - 20, p 2423)

(NASA-Case-ARC-10462-1; US-Patent-3,818,775; US-Patent-Appl-SN-310615; US-Patent-Class-74-675; US-Patent-Class-74-710) Avail: US Patent Office CSCL 131

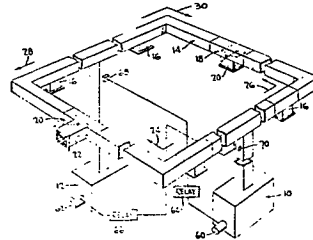
Two input members and two concentric rotatable output members are interconnected by a planetary gear arrangement. The first input drives directly the first output. The second input engages a carrier having the planetary gears affixed thereto. Rotation of the carriage causes rotation of the central sun gear of the planetary gear system. The sun gear is journaled to the carriage and is drivingly connected to the second output through a direction reversing set of bevel gears. The first input drive member includes a ring gear drivingly connected to the planetary gears for driving the second output member in the same direction and by the same amount as the first output member. Motion of the first input results in equal motion of the two outputs while input motion of the second input results in movement of the second output relative to the first output. This device is useful where non-interacting two-axis control of remote gimbaled systems is required.

Official Gazette of the U.S. Patent Office



air from the supply duct to the associated outlet regardless of the direction of air flow within the supply duct. The valve means comprises an automatic air volume control apparatus for distribution within the air supply duct into which air may be introduced from two opposite directions. The apparatus incorporates a freely swinging movable vane in the supply duct to automatically channel into the associated outlet only the deflected air flow which has the higher relative pressure.

Official Gazette of the U.S. Patent Office



**N74-27903\*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

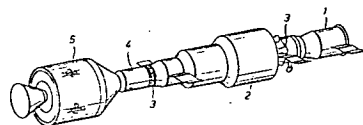
**LATCH MECHANISM**

Larry P. Ratcliff, inventor (to NASA) 28 Jun. 1974 9 p Filed 26 Oct. 1972 Supersedes N73-11443 (11 - 02, p 0178)

(NASA-Case-MSC-12549-1; US-Patent-3,820,741; US-Patent-Appl-SN-301039; US-Patent-Class-244-1SD) Avail: US Patent Office CSCL 13E

A latching mechanism is described which has a latch member which will collapse when a latching surface is passed over it and brought into a position to engage the latch member. It will return and automatically engage the latching surface as the latching surface passes completely by the latch member. The latch member is pivotally attached to a linking member which is pivotally mounted in a housing. This arrangement makes the release and disengagement of the latch member from the latching surface easier and more expedient than was possible with capture latches. The improved capture.

Official Gazette of the U.S. Patent Office



**N74-27902\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**AIR CONDITIONING SYSTEM AND COMPONENT THEREFOR DISTRIBUTING AIR FLOW FROM OPPOSITE DIRECTIONS**  
**Patent**

Henry D. Obler and Hugh B. Bauer, inventors (to NASA) Issued 25 Jun. 1974 9 p Filed 28 Apr. 1972 Supersedes N72-28503 (10 - 19, p 2570)

(NASA-Case-GSC-11445-1; US-Patent-3,818,814; US-Patent-Appl-SN-248471; US-Patent-Class-98-39; US-Patent-Class-236-49) Avail: US Patent Office CSCL 131

The air conditioning system comprises a plurality of separate air conditioning units coupled to a common supply duct such that air may be introduced into the supply duct in two opposite flow directions. A plurality of outlets such as registers or auxiliary or branch ducts communicate with the supply duct and valve means are disposed in the supply duct at at least some of the outlets for automatically channelling a controllable amount of



## 15 MACHINE ELEMENTS AND PROCESSES

**N74-27904\*** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.

### **MAGNETOCALORIC PUMP Patent**

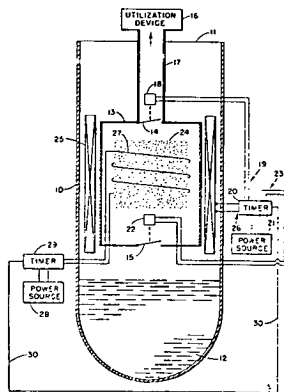
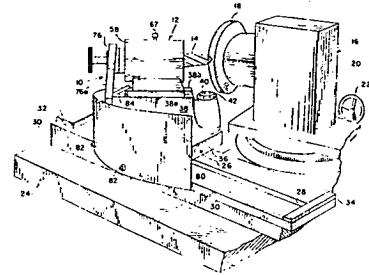
Gerald V. Brown, inventor (to NASA) Issued 25 Jun. 1974  
4 p Filed 10 Nov. 1972 Supersedes N73-14479 (11 - 05,  
p 0551)

(NASA-Case-LEW-11672-1; US-Patent-3,819,299;

US-Patent-Appl-SN-305639; US-Patent-Class-417-52) Avail:  
US Patent Office CSCL 13K

A vessel having inlet and outlet valves is disposed in a container with a fluid to be pumped which may be evolved from a liquid in the container below the vessel. A magnetocaloric substance is disposed in the vessel and causes fluid vapor in the vessel to expand and be expelled through the outlet valve. Vapor is drawn in through the inlet valve as the substance cools. The inlet valves may be one-way check valves or may be solenoid valves energized at appropriate times by timing circuits. A timer controlled heating element may also be disposed in the vessel to operate in conjunction with the magnetic field.

Official Gazette of the U.S. Patent Office



**N74-30916\*+** National Aeronautics and Space Administration.  
Lyndon B. Johnson Space Center, Houston, Tex.

### **AUGER ATTACHMENT METHOD FOR INSULATION Patent Application**

William C. Schneider, inventor (to NASA) Filed 24 Jul. 1974  
11 p

(NASA-Case-MSC-12615-1; US-Patent-Appl-SN-491417) Avail:  
NTIS HC \$4.00 CSCL 13E

An auger device is used to attach rigid surface insulation to a spacecraft. The auger is screwed into an insulation tile which has been predrilled. The auger combination is then fastened to the spacecraft using an attachment screw which penetrates the spacecraft skin, which is secured by a blind end fastener. In an alternate method, the auger is incorporated in the insulation tile when the tile is fabricated.

NASA

**N74-27905\*** National Aeronautics and Space Administration.  
Langley Research Center, Langley Station, Va.

### **GRINDING ARRANGEMENT FOR BALL NOSE MILLING CUTTERS Patent**

Charles F. Burch, inventor (to NASA) Issued 28 Jun. 1974  
9 p Filed 14 Sep. 1972 Supersedes N73-10504 (11 - 01,  
p 0061)

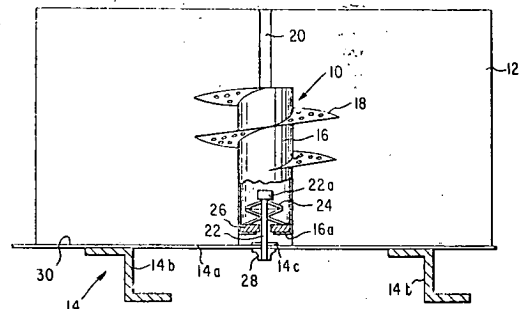
(NASA-Case-LAR-10450-1; US-Patent-3,820,286;

US-Patent-Appl-SN-289017; US-Patent-Class-51-97R;

US-Patent-Class-51-225; US-Patent-Class-51-234) Avail: US  
Patent Office CSCL 131

A grinding arrangement for spiral fluted ball nose end mills and like tools includes a tool holder for positioning the tool relative to a grinding wheel. The tool is mounted in a spindle within the tool holder for rotation about its centerline and the tool holder is pivotably mounted for angular movement about an axis which intersects that centerline. A follower arm of a cam follower secured to the spindle cooperates with a specially shaped cam to provide rotation of the tool during the angular movement of the tool holder during the grinding cycle, by an amount determined by the cam profile. In this way the surface of the cutting edge in contact with the grinding wheel is maintained at the same height on the grinding wheel throughout the angular movement of the tool holder during the grinding cycle.

Official Gazette of the U.S. Patent Office



**N74-32917\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**APPARATUS FOR FORMING DRIVE BELTS Patent**

Albert Topits, Jr., inventor (to NASA) (JPL) Issued 3 Sep. 1974 10 p Filed 31 Aug. 1973 Supersedes N73-31442 (11 - 22, p 2677) Sponsored by NASA

(NASA-Case-NPO-13205-1; US-Patent-3,833,322;

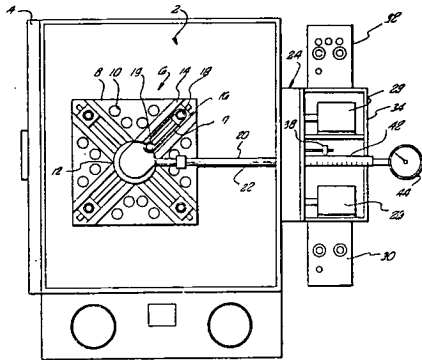
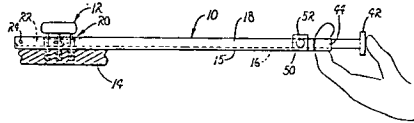
US-Patent-Appl-SN-393525; US-Patent-Class-425-288;

US-Patent-Class-425-35) Avail: US Patent Office CSCL 13H

An apparatus for manufacturing belts, such as seamless belts, is provided, the apparatus has relatively movable rollers that are mounted in an oven. A belt blank, for example, of a thin polyester film, is rotated on the rollers as heat is applied. Four rollers, each mounted on a separate roller assembly, are movable along appropriate tracks while a fifth centrally located roller is stationary. A pair of dc motors are operatively connected to a speed reduction gear assembly to provide a pair of rotating drive shafts that extend into the oven. One rotating shaft drives all of the rollers through a rotational gear assembly while the other drive shaft is capable of positioning the movable rollers through respective rotating threaded shafts. Control devices are provided for controlling the motors while measuring devices are operatively connected to the positional drive shaft to indicate the position of the rollers.

Official Gazette of the U.S. Patent Office

supported for oscillation induced in response to axial motion imparted to the rigid link. A lifting plate is pivotally coupled to the distal end of the pivotal link so that oscillatory motion imparted to the pivotal link serves to move the plate vertically for elevating the plate into lifting engagement with the electronic package positioned thereabove. Official Gazette of the U.S. Patent Office



**N74-32919\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**METHOD OF ELECTROFORMING A ROCKET CHAMBER Patent**

Anthony Fortini, inventor (to NASA) Issued 27 Aug. 1974 3 p Filed 14 Sep. 1972 Supersedes N72-32501 (10 - 23, p 3099)

(NASA-Case-LEW-11118-1; US-Patent-3,832,290;

US-Patent-Appl-SN-289050; US-Patent-Class-204-9) Avail: US Patent Office CSCL 13H

A transpiration cooled rocket chamber is made by forming a porous metal wall on a suitably shaped mandrel. The porous wall may be made of sintered powdered metal, metal fibers sintered on the mandrel or wires woven onto the mandrel and then sintered to bond the interfaces of the wires. Intersecting annular and longitudinal ribs are then electroformed on the porous wall. An interchamber wall having orifices therein is then electroformed over the annular and longitudinal ribs. Parallel longitudinal ribs are then formed on the outside surface of the interchamber wall after which an annular jacket is electroformed over the parallel ribs to form distribution passages therewith. A feed manifold communicating with the distribution passages may be fabricated and welded to the rocket chamber or the feed manifold may be electroformed in place.

Official Gazette of the U.S. Patent Office

**N74-32918\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**TOOL FOR USE IN LIFTING PIN SUPPORTED OBJECTS Patent**

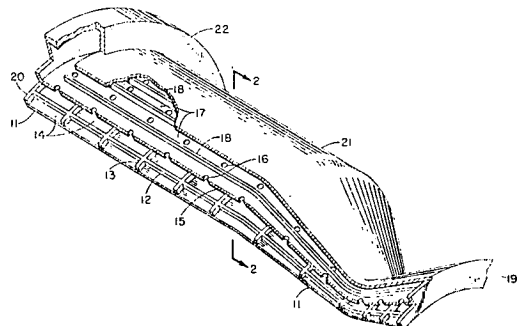
Ronald A. Marzek (JPL) and William S. Read, inventors (to NASA) (JPL) Issued 3 Sep. 1974 3 p Filed 18 Jun. 1973 Supersedes N73-26475 (11 - 17, p 2036) Sponsored by NASA

(NASA-Case-NPO-13157-1; US-Patent-3,832,764;

US-Patent-Appl-SN-370872; US-Patent-Class-29-203H;

US-Patent-Class-29-268) Avail: US Patent Office CSCL 13I

A tool for use in lifting a pin-supported, electronic package mounted in juxtaposition with the surface of an electronic circuit board is described. The tool is configured to be received beneath a pin-supported package and is characterized by a manually operable linkage, including an elongated, rigid link supported for axial reciprocation and a pivotal link pinned to the body and



## 15 MACHINE ELEMENTS AND PROCESSES

**N74-32920\*** National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

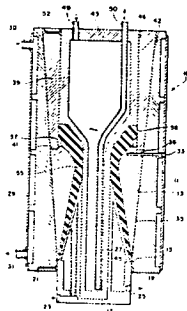
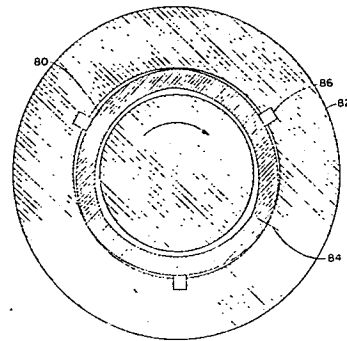
### MOLDING APPARATUS Patent

Wilbur C. Heier, inventor (to NASA) Issued 20 Aug. 1974 16 p Filed 11 Apr. 1973 Supersedes N73-31446 (11 - 22, p 2677) Continuation-in-part of US Patent Appl. SN-198763, filed 15 Nov. 1971

(NASA-Case-LAR-10489-2; US-Patent-3,830,609; US-Patent-Appl-SN-350300; US-Patent-Class-425-128; US-Patent-Class-249-83; US-Patent-Class-249-145; US-Patent-Class-249-184; US-Patent-Class-425-415; US-Patent-Class-249-95; US-Patent-Appl-SN-198763) Avail: US Patent Office CSCL 13H

Apparatus for compression molding of thermosetting plastics compositions including interfitting hollow male and female components is reported. The components are adapted to be compressed to form a rocket nozzle in a cavity. A thermal jacket is provided exteriorly adjacent to the female component for circulating a thermal transfer fluid to effect curing of a thermosetting plastics material being molded. Each of the male and female components is provided with suitable inlets and outlets for circulating a thermal transfer fluid.

Official Gazette of the U.S. Patent Office



**N74-32925\*#** National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Tex.  
**REFINEMENT CONTROL IN TIG ARC WELDING Patent Application**

William F. Iceland (N. Am. Rockwell Corp.) and Edwin L. Whiffen, inventors (to NASA) (N. Am. Rockwell Corp.) Filed 13 Nov. 1973 15 p

(Contract NAS9-150)

(NASA-Case-MS-C-19095-1; US-Patent-Appl-SN-415486) Avail: NTIS HC \$4.00 CSCL 13H

A method for controlling the frequency of direct current pulse welding voltages is discussed. The system is used with electric arc welding in an inert gas environment to produce at uniform fine grained structure in the welded material. The procedure for achieving weld puddle agitation without mechanically agitating the weld is described. The steps for varying the frequency of the arc gas voltage, selecting the frequency which produces the maximum value of arc gas voltage, and maintaining the operating frequency at this maximum frequency to produce maximum weld puddle agitation are explained.

NASA

**N74-32921\*** National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

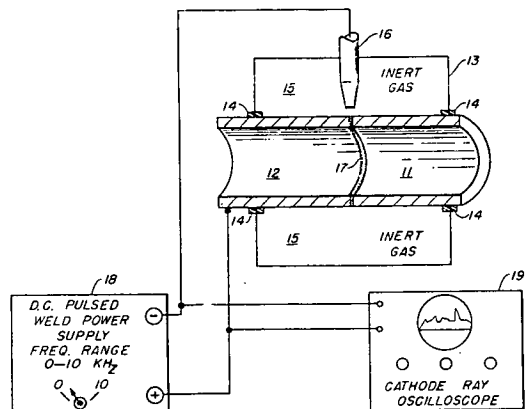
### JOURNAL BEARINGS Patent

Fredrick T. Schuller and Warren A. Moore, inventors (to NASA) Issued 20 Aug. 1974 14 p Filed 30 Mar. 1973 Supersedes N73-20533 (11 - 11, p 1298) Continuation-in-part of US Patent Appl. SN-238264, filed 27 Mar. 1972

(NASA-Case-LEW-11076-2; US-Patent-3,830,552; US-Patent-Appl-SN-346483; US-Patent-Class-308-121; US-Patent-Appl-SN-238264) Avail: US Patent Office CSCL 13I

A plurality of bearing sectors are mounted in a housing. Each sector functions as a lobed area in the bearing to obtain the required lubricant film geometry.

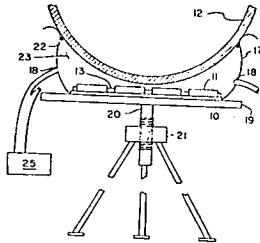
Official Gazette of the U.S. Patent Office



**N74-32926\*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.  
**APPARATUS FOR POSITIONING MODULAR COMPONENTS ON A VERTICAL OR OVERHEAD SURFACE** Patent Application

Cyrus C. Haynie (N. Am. Rockwell Corp.) and Samuel V. Messineo, inventors (to NASA) (N. Am. Rockwell Corp.) Filed 30 Aug. 1974 13 p Sponsored by NASA  
 (NASA-Case-LAR-11465-1; US-Patent-Appl-SN-502137) Avail: NTIS HC \$4.00 CSCL 131

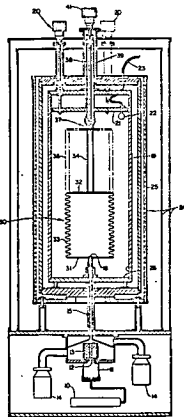
An apparatus for holding several modular components against a surface is described. A flexible fixture prepositions the components and a vacuum develops a uniform pressure which presses and holds the fixture and objects in place. The surface may be curved, vertical, or overhead. Diagrams of the device are provided. NASA



**N74-33997\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**ATOMIC STANDARD WITH VARIABLE STORAGE VOLUME** Patent Application

Harry E. Peters, inventor (to NASA) Filed 3 Oct. 1974 14 p (NASA-Case-GSC-11895-1; US-Patent-Appl-SN-511887) Avail: NTIS HC \$4.00 CSCL 13D

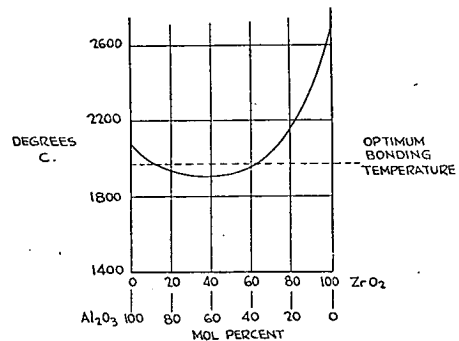
A cylindrical, convoluted, flexible bellows is used to form an atomic or molecular storage vessel with constant surface area and surface properties but adjustable volume. When utilized as a storage bulb inside an atomic or molecular frequency standard such as a hydrogen maser, it provides an apparatus for obtaining an extremely accurate measurement of the frequency deviation caused by the interaction of gas atoms (or molecules) with the vessel wall surface (i.e., the so-called wall shift). NASA



**N74-34002\*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.  
**BONDING OF SAPPHIRE TO SAPPHIRE BY EUTECTIC MIXTURE OF ALUMINUM OXIDE AND ZIRCONIUM OXIDE** Patent Application

John J. DeLuca, inventor (to NASA) Filed 17 Sep. 1974 12 p  
 (NASA-Case-GSC-11577-2; US-Patent-Appl-SN-506803) Avail: NTIS HC \$4.00 CSCL 13H

Bonding of an element comprising sapphire, ruby, or blue sapphire to another element of such material with a eutectic mixture of aluminum oxide and zirconium oxide is described. The bonding mixture may be applied in the form of a distilled water slurry or by electron beam vapor deposition. The eutectic is formed in situ by applying a layer of zirconium oxide and then heating the assembly to a temperature above the eutectic temperature and below the melting point of the material from which the elements are formed. The formation of a sapphire rubidium maser cell utilizing eutectic bonding is shown. NASA

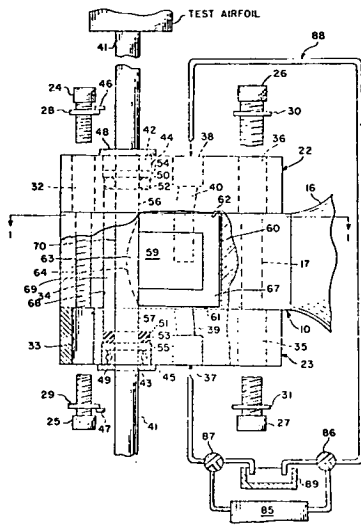


**N74-34881\*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

**MINIATURE HYDRAULIC ACTUATOR** Patent Application  
 Francis D. Severt, inventor (to NASA) (Boeing Co.) Filed 10 Oct. 1974 13 p Sponsored by NASA

(NASA-Case-LAR-11522-1; US-Patent-Appl-SN-513689) Avail: NTIS HC \$4.00 CSCL 131

A miniature reversible rotary actuator is reported that operates by hydraulic fluid pressure. A shaft mounted vane is free to displace angularly within a chamber under the influence of fluid pressure introduced at either extremity of the chamber. When appropriate internal and external sealing is used, the actuator is capable of exerting a very high torque in either rotative direction relative to its size and weight. Use of an incompressible actuating fluid enables it to be used as a precision positioner and to respond quickly and accurately to changes in fluid pressure inputs. Author (NASA)



**N74-34882\*** National Aeronautics and Space Administration.  
Marshall Space Flight Center, Huntsville, Ala.

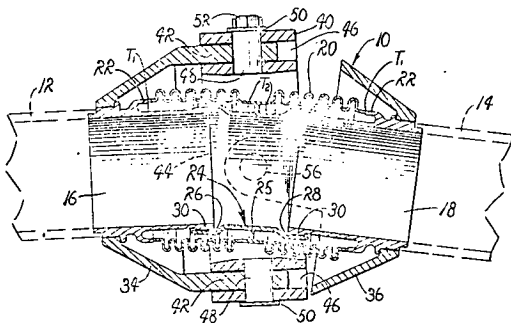
**AN EXTERNALLY SUPPORTED INTERNALLY STABILIZED  
FLEXIBLE DUCT JOINT Patent Application**

James R. Rollins, inventor (to NASA) (Rocketdyne) Filed 27 Jun.  
1974 15 p. Sponsored by NASA

(NASA-Case-MFS-19194-1; US-Patent-Appl-SN-483850) Avail:  
NTIS HC \$4.00 CSCL 13E

A description is given of an externally supported internally stabilized flexible duct joint particularly suited for use in conducting the flow of fluid between a pair of tubular conduits, at least one of which is supported for motion relative to the other. The joint is characterized by a low-flow loss coefficient and includes a pair of coaxially related terminal sleeves adapted to be coupled with adjacently disposed conduits, and an elongated bellows extended between the terminal sleeves. The bellows is supported against thrust induced extension by linkage including a gimbal ring concentrically related to the mid-span of the bellows and a pair of terminal supports affixed to the terminal sleeves and journaled to the gimbal ring. A bellows stabilizing sleeve is disposed within the bellows for avoiding flow impingement and preventing lateral shifting while a support ring is mounted on the stabilizing sleeve and connected to the mid-span of the bellows for connecting the bellows with the stabilizing sleeve.

NASA



# 16 MASERS

Includes applications of masers and lasers. For basic research see: 26 Physics, Solid-State.

**N74-32937\*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

## **SCHOTTKY BARRIER LASER ENERGY CONVERTER Patent Application**

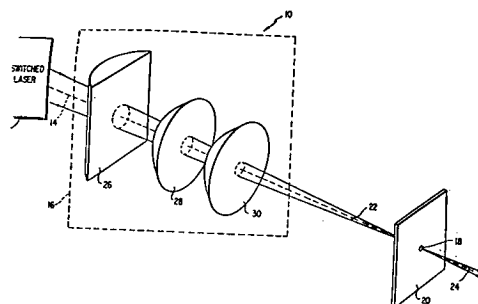
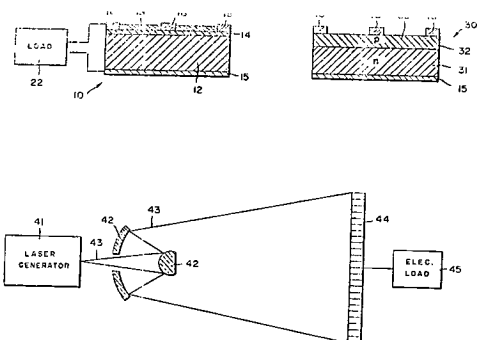
Richard J. Stirn (JPL) and Yea-Chuan M. Yeh, inventors (to NASA) (JPL) Filed 27 Aug. 1974 15 p

(Contract NAS7-100)

(NASA-Case-NPO-13390-1; US-Patent-Appl-SN-501013) Avail: NTIS HC \$4.00 CSCL 20E

A Schottky barrier (SB) type cell for conversion of laser beam energy of wavelength of 0.6 microns and less is described. The cell consists of a thin layer of semiconductor material with a band gap of about 2eV or more, and a very thin layer of semitransparent metal on the order of 100 deg. A or less, deposited on the semiconductor material. Contacts are deposited on the bottom side of the semiconductor material and on top of the metal layer, the latter contact in the form of the grid structure.

NASA



**N74-34012\*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

## **DOUBLE DISCHARGE METAL VAPOR LASER WITH METAL HALIDE AS A LASANT Patent Application**

Gary R. Russell (JPL), Che-Jen Chen (JPL), and Noble M. Nerheim, inventors (to NASA) (JPL) Filed 3 Oct. 1974 10 p

(Contract NAS7-100)

(NASA-Case-NPO-13448-1; US-Patent-Appl-SN-511888) Avail: NTIS HC \$4.00 CSCL 20E

A double discharge metal vapor laser in which a metal halide is used as the lasant, is disclosed. The laser includes a heated discharge tube within which a metal halide is contained. The discharge tube is provided with a pair of electrodes for producing electrical discharges. The ends of the tube are closed with a pair of Brewster windows outside of which are positioned a pair of suitable mirrors. Heating of the discharge tube and the metal halide contained within it produces metal halide vapor. A first electrical discharge causes dissociation of the metal halide vapor to produce metal atoms. After a predetermined time delay to permit metastable relaxation of the metal atoms, a second electrical discharge acts as a pumping pulse to produce a population inversion and hence lasing.

NASA

**N74-34010\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

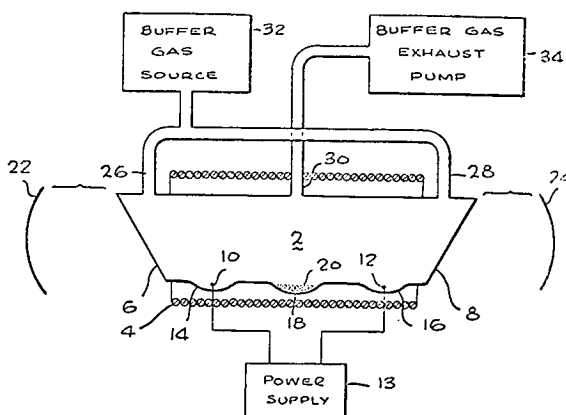
## **SPATIAL FILTER FOR Q-SWITCHED LASERS Patent Application**

Ralph F. Wuerker and Lee O. Heflinger, inventors (to NASA) Filed 2 Oct. 1974 9 p

(NASA-Case-LEW-12164-1; US-Patent-Appl-SN-511334) Avail: NTIS HC \$4.00 CSCL 20E

A spatial filtered Q-switched laser system is disclosed having means to prevent ionization of air in close proximity to the aperture of the spatial filter. A compound lens system having an astigmatic focus is found between the laser and the spatial filter for defocusing the light beam emanating from the laser in the vicinity of the aperture of the spatial filter to an intensity below that which produces ionization of air. The preferred construction of the compound lens system as viewed from the laser comprises a cylindrical lens and a pair of positive lenses.

NASA



## 17 MATERIALS, METALLIC

Includes cermets; corrosion; physical and mechanical properties of materials; metallurgy; and applications as structural materials. For basic research see: 06 Chemistry. For related information see also: 18 Materials, Nonmetallic; and 32 Structural Mechanics.

**N74-27963\*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COATING SUPERALLOYS Patent Application**

Michael A. Gedwill and Salvatore J. Grisaffe, inventors (to NASA)

Issued 27 Jun. 1974 10 p

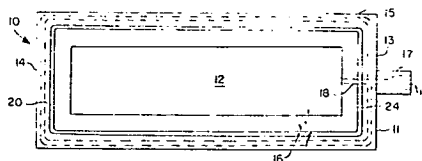
(NASA-Case-LEW-11696-3; US-Patent-Appl-SN-483853) Avail:

NTIS HC \$4.00 CSCL 11F

An analysis was made of the protection provided to superalloy and dispersion strengthened alloy surfaces by an aluminized coating. The coatings have long time oxidation and thermal fatigue resistance properties. NASA

## 18 MATERIALS, NONMETALLIC

Includes corrosion; physical and mechanical properties of materials (e.g., plastics); and elastomers, hydraulic fluids, etc. For basic research see: 06 Chemistry. For related information see also: 17 Materials, Metallic; 27 Propellants; and 32 Structural Mechanics.



**N74-23125\*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**REINFORCED STRUCTURAL PLASTICS Patent**

Hyman R. Lubowitz (TRW, Inc., Redondo Beach, Calif.), William P. Kendrick (TRW, Inc., Redondo Beach, Calif.), John F. Jones (TRW, Inc., Redondo Beach, Calif.), Richard S. Thorpe (TRW, Inc., Redondo Beach, Calif.), and Eugene A. Burns, inventors (to NASA) (TRW, Inc., Redondo Beach, Calif.) Issued 7 Mar. 1972 3 p. Filed 10 Jul. 1967. Sponsored by NASA.

(NASA-Case-LEW-10199-1; US-Patent-3,647,529;

US-Patent-Appl-SN-651972; US-Patent-Class-117-161UN;

US-Patent-Class-117-126GR; US-Patent-Class-117-132B;

US-Patent-Class-260-78TF) Avail: US Patent Office CSCL 11D

Reinforced polyimide structures are described. Reinforcing materials are impregnated with a suspension of polyimide prepolymer and bonded together by heat and pressure to form a cured, hard-reinforced, polyimide structure.

Official Gazette of the U.S. Patent Office

**N74-27037\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**INTUMESCENT COMPOSITION, FOAMED PRODUCT PREPARED THEREWITH AND PROCESS FOR MAKING SAME Patent**

Salvatore R. Riccitiello and John A. Parker, inventors (to NASA) Issued 25 Jun. 1974 5 p. Filed 26 Dec. 1972. Continuation-in-part of US Patent Appl. SN-140946, filed 6 May 1971

(NASA-Case-ARC-10304-2; US-Patent-3,819,550;

US-Patent-Appl-SN-318358; US-Patent-Class-260-2.5FP;

US-Patent-Class-106-15FP; US-Patent-Class-102-105;

US-Patent-Class-252-8.1; US-Patent-Class-252-62;

US-Patent-Class-260-2R; US-Patent-Class-260-2.5R;

US-Patent-Class-260-396N; US-Patent-Class-260-DIG.24;

US-Patent-Appl-SN-140946) Avail: US Patent Office CSCL 11D

An intumescent composition and the foamed product prepared by heating the composition are provided. The composition comprises the reaction product of para-benzoquinone dioxime and a concentrated mineral acid such as sulfuric acid, phosphoric acid, and polyphosphoric acid. The composition is useful as an intumescent agent either by itself or when combined with other materials. A fire-resistant and heat-insulating composition is provided by heating the intumescent composition above its intumescent temperature.

Official Gazette of the U.S. Patent Office

**N74-27035\*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

**METHOD OF LAMINATING STRUCTURAL MEMBERS Patent**

Wilbur C. Heier, inventor (to NASA) Issued 4 Jun. 1974 5 p. Filed 20 Jun. 1972

(NASA-Case-XLA-11028-1; US-Patent-3,814,653;

US-Patent-Appl-SN-219435; US-Patent-Class-156-285) Avail:

US Patent Office CSCL 11D

A laminate is obtained by providing a lightweight core material, such as a honeycombed plastic or metal, within the cavity defined by an annular mold cavity frame. Face sheets, which are to be bonded to the core material, are provided on opposite sides of the frame and extend over the frame, thus sealing the core material in the cavity. An adhesive is provided between the core material and the face sheets and the combined thickness of the core material and adhesive is a close fit within the opposed face sheets. A gas tight seal, such as an O-ring gasket, is provided between the frame and the face sheet members to form a gas tight cavity between the face sheet members and the frame. External heat and pressure are used to bond the face sheets to the core material. Gas pressure is introduced into the sealed cavity to minimize out-gassing of the adhesive.

Official Gazette of the U.S. Patent Office

**N74-30001\*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

**METHOD OF REPAIRING DISCONTINUITY IN FIBERGLASS STRUCTURES Patent**

Leonard L. Gelb (Hercules, Inc., Wilmington, Del.), William B. Helbert, Jr. (Hercules, Inc., Wilmington, Del.), Ronald B. Enie (Hercules, Inc., Wilmington, Del.), and Richard F. Mulliken, inventors (to NASA) Issued 4 Jun. 1974 4 p. Filed 9 May 1972. Sponsored by NASA

(NASA-Case-LAR-10416-1; US-Patent-3,814,645;

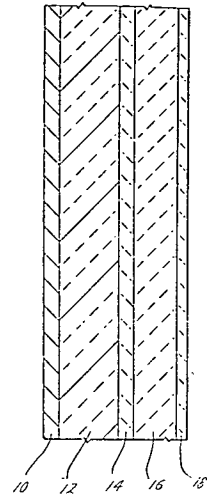
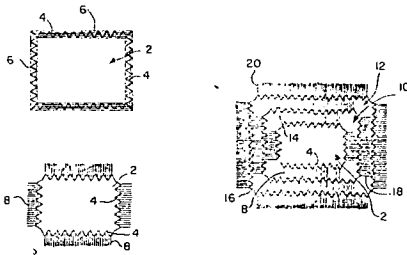


## 18 MATERIALS, NONMETALLIC

US-Patent-Appl-SN-251752; US-Patent-Class-156-94) Avail:  
US Patent Office CSCL 11D

Damaged fiberglass structures are repaired by substantially filling the irregular surfaced damaged area with a liquid, self-curing resin, preferably an epoxy resin mixed with chopped fiberglass, and then applying to the resin surface the first of several woven fiberglass swatches which has stitching in a zig-zag pattern parallel to each of its edges and a fringe of warp and fill glass fibers about the edges outward of the stitching. The method is especially applicable to repair of fiberglass rocket engine casings and is particularly advantageous since it restores the repaired fiberglass structure to substantially its original strength without any significant changes in the geometry or mass of the structure.

Official Gazette of the U.S. Patent Office



**N74-30005\*#** National Aeronautics and Space Administration,  
Lyndon B. Johnson Space Center, Houston, Tex.

### **CERAMIC COATING FOR SILICA INSULATION Patent Application**

Alexander Pechman (Lockheed Missiles and Space Co., Sunnyvale, Calif.) and Robert M. Beasley, inventors (to NASA) (Lockheed Missiles and Space Co., Sunnyvale, Calif.) Issued 24 Jun. 1974 17 p

(Contract NAS9-12137)

(NASA-Case-MSC-14270-1; US-Patent-Appl-SN-482104) Avail:  
NTIS HC \$4.00 CSCL 11C

Low density, fibrous, rigid, silica insulations are rendered impervious to moisture by application of a ceramic glaze coating comprising a silica barrier layer, and an emissivity glaze layer comprising a high silica glass component, an emissivity agent, and a borosilicate glass component. The resulting ceramic glaze laminate adhered to the fibrous silica insulation provides a moisture-impervious insulating material which exhibits a high emissivity and is resistant to delamination and spalling at repeated cycles of thermal shock.

NASA

**N74-30004\*#** National Aeronautics and Space Administration,  
Lyndon B. Johnson Space Center, Houston, Tex.

### **CERAMIC COATING FOR SILICA INSULATION Patent Application**

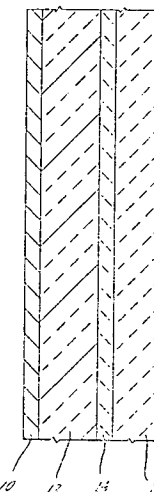
Alexander Pechman (Lockheed Missiles and Space Co., Sunnyvale, Calif.) and Robert M. Beasley, inventors (to NASA) (Lockheed Missiles and Space Co., Sunnyvale, Calif.) Issued 24 Jun. 1974 16 p

(Contract NAS9-12137)

(NASA-Case-MSC-14270-2; US-Patent-Appl-SN-482105) Avail:  
NTIS HC \$4.00 CSCL 11C

Lightweight, reusable, surface-insulating material for spacecraft has been developed. Since the low density, fibrous, refractory, silica insulations are quite porous and readily absorb moisture, it is necessary to coat the surfaces of such insulations with a coating which renders them impervious to moisture. A two-layered ceramic glaze coating for such silica insulations is described.

NASA



## 19 MATHEMATICS

Includes calculation methods and theory; and numerical analysis. For applications see specific categories. For related information see also: 08 Computers.

No abstracts in this subject category.

## 21 NAVIGATION

Includes guidance; autopilots; star and planet tracking; inertial platforms; and air traffic control. For related information see also: 07 Communications.

frequencies where precision signals are required for a steady vehicle attitude. The blended signals are applied in a conventional manner to control the gimbaling of vehicle engines about control axes.

Author

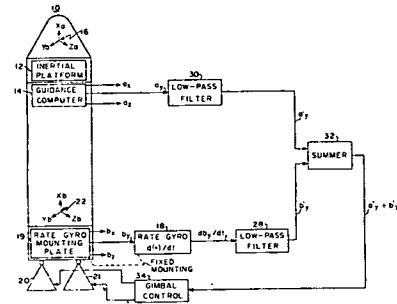
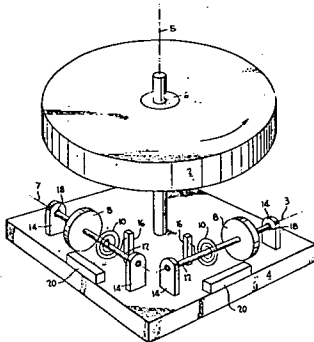
**N74-28097\*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

### PASSIVE DUAL SPIN MISALIGNMENT COMPENSATORS Patent

James H. Donohue and Benjamin G. Zimmerman, inventors (to NASA) Issued 25 Jun. 1974 5 p Filed 29 Sep. 1972 Supersedes N73-11680 (11 - 02, p 0207) (NASA-Case-GSC-11479-1; US-Patent-3,818,767; US-Patent-Appl-SN-293739; US-Patent-Class-74-5.5; US-Patent-Class-244-1SA) Avail: US Patent Office CSCL 22B

A combination dual-spin gyroscopically stabilized device is described having a spinning rotor and a non-spinning platform. Two substantially lossless mechanical resonators, resonant at the spin frequency, are orthogonally positioned on the platform for compensation for the disturbing torque acting on the platform due to rotor misalignment.

Official Gazette of the U.S. Patent Office



**N74-35096\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### AN ATTITUDE CONTROL SYSTEM Patent Application

Charles C. Rupp and George L. VanPragenau, inventors (to NASA) Filed 2 Oct. 1974 12 p (NASA-Case-MFS-22787-1; US-Patent-Appl-SN-511346) Avail: NTIS HC \$4.00 CSCL 22B

An attitude control system for space vehicle is reported in which angular rate signals are generated by rate gyros mounted closely adjacent to gimbale engines at the rear of a vehicle, and wherein error signals representative of a commanded change in vehicle angle or attitude are obtained from a precision inertial platform located in the nose region of the vehicle. The rate gyro derived signals dominate at high frequencies where dynamic effects become significant, and platform signals dominate at low

## **22 NUCLEAR ENGINEERING**

# **22 NUCLEAR ENGINEERING**

Includes nuclear reactors and nuclear heat sources used for propulsion and auxiliary power. For basic research see: 24 Physics, Atomic, Molecular, and Nuclear. For related information see also: 03 Auxiliary Systems; and 28 Propulsion Systems.

No abstracts in this subject category.

## 23 PHYSICS, GENERAL

Includes acoustics, cryogenics, mechanics, and optics. For astrophysics see: 30 Space Sciences. For geophysics and related information see also: 13 Geophysics, 20 Meteorology; and 29 Space Radiation.

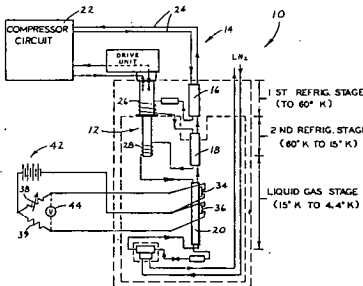
**N74-28134\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

### AN IMPROVED HELIUM REFRIGERATOR Patent Application

Ervin R. Wiebe, inventor (to NASA) (JPL) Issued 12 Jun. 1974 14 p Sponsored by NASA (Contract NAS7-100) (NASA-Case-NPO-13435-1; US-Patent-Appl-SN-478803) Avail: NTIS HC \$4.00 CSCL 20L

An improved helium refrigerator is described with a plurality of counter-flow heat exchangers and a maximum reserve cooling capacity. The final, or low temperature heat exchanger is substantially filled with liquid helium. An electrical bridge circuit including a pair of temperature-responsive resistors is mounted on the low temperature heat exchanger for providing a continuous indication of the reserve cooling capacity of the refrigerator.

Author



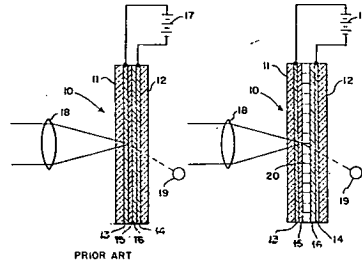
**N74-30118\*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

### REAL TIME LIQUID CRYSTAL IMAGE CONVERTER Patent Application

James B. Robertson, inventor (to NASA) Issued 24 Jul. 1974 8 p (NASA-Case-LAR-11206-1; US-Patent-Appl-SN-491413) Avail: NTIS HC \$4.00 CSCL 20F

A liquid crystal image converter that allows viewing while the image is being recorded in real time is presented. The converter is comprised of an opaque layer inserted between the liquid crystal layer and the photoconductor layer for shielding the photoconductor layer from the light for viewing the image formed

in the liquid crystal layer, and for allowing an electric current to flow through the opaque layer whereby the image in the crystal can be viewed while it is being formed without interfering with the image forming process. This device is used to convert a nonvisible image, in the infrared or ultraviolet, into a visible image. NASA



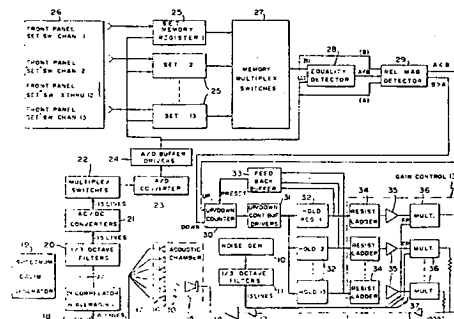
**N74-31148\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

### DIGITAL SERVO CONTROL OF RANDOM SOUND TEST EXCITATION Patent

Robert B. Nakich, inventor (to NASA) (JPL) Issued 6 Aug. 1974 14 p Filed 16 Mar. 1972 Supersedes N72-25628 (10 - 16, p 2183) Sponsored by NASA (NASA-Case-NPO-11623-1; US-Patent-3,827,288; US-Patent-Appl-SN-235338; US-Patent-Class-73-69; US-Patent-Class-73-71.5R; US-Patent-Class-181.5R) Avail: US Patent Office CSCL 20A

A digital servocontrol system for random noise excitation of a test object in a reverberant acoustic chamber employs a plurality of sensors spaced in the sound field to produce signals in separate channels which are decorrelated and averaged. The average signal is divided into a plurality of adjacent frequency bands cyclically sampled by a time division multiplex system, converted into digital form, and compared to a predetermined spectrum value stored in digital form. The results of the comparisons are used to control a time-shared up-down counter to develop gain control signals for the respective frequency bands in the spectrum of random sound energy picked up by the microphones.

Official Gazette of the U.S. Patent Office



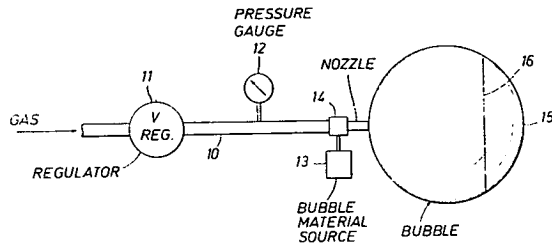
## 23 PHYSICS, GENERAL

**N74-33142\*#** National Aeronautics and Space Administration.  
Lyndon B. Johnson Space Center, Houston, Tex.

**SPACE MIRRORS Patent Application**

David E. Pitts, inventor (to NASA) Filed 27 Feb. 1974 11 p  
(NASA-Case-MSC-12611-1; US-Patent-Appl-SN-446560) Avail:  
NTIS HC \$4.00 CSCL 20F

Methods and apparatus for coating a curved surface in a  
zero gravity environment to form a mirror are reported. NASA



## **24 PHYSICS, ATOMIC, MOLECULAR, AND NUCLEAR**

### **24 PHYSICS, ATOMIC, MOLECULAR, AND NUCLEAR**

Includes atomic, molecular and nuclear physics. For applications see: 22 Nuclear Engineering. For related information see also: 29 Space Radiation.

**No abstracts in this subject category.**

## 25 PHYSICS, PLASMA

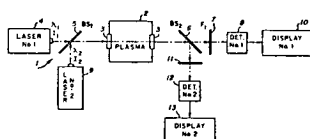
Includes magnetohydrodynamics. For applications see: 28 Propulsion Systems.

**N74-30156\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.  
**MEASUREMENT OF PLASMA TEMPERATURE AND DENSITY USING RADIATION ABSORPTION** Patent  
 Kenneth W. Billman, Paul D. Rowley, James R. Stallcop, and Leroy L. Presley, inventors (to NASA) Issued 18 Jun. 1974  
 6 p Filed 26 Dec. 1972 Supersedes N73-29750 (11 - 20, p 2458)

(NASA-Case-ARC-10598-1; US-Patent-3,817,622; US-Patent-Appl-SN-318151; US-Patent-Class-356-73; US-Patent-Class-356-43; US-Patent-Class-356-85; US-Patent-Class-356-87; US-Patent-Class-356-201) Avail: US Patent Office CSCL 20I

A procedure, using a light beam of predetermined wavelength, preferably monochromatic, for measuring plasma characteristics is presented. Light absorbed by the plasma is used to obtain an absorption coefficient for the plasma. From this known coefficient and independent measurement of either the electron density or temperature of the plasma, an equation may be solved to obtain other unknown quantities. In this procedure, the absorption coefficient of the plasma is derived simultaneously for two probing light beams of substantially different predetermined wavelengths. These two coefficients are used to solve the two equations, which are in turn used to determine plasma electron density and temperature.

Official Gazette of the U.S. Patent Office



**N74-35145\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

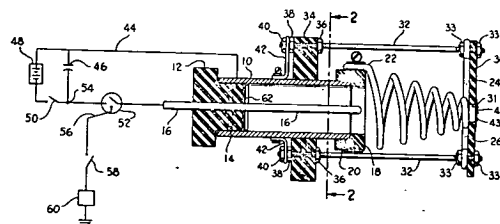
**SELF-ENERGIZED PLASMA COMPRESSOR** Patent Application

Edward L. Shriver and Eduard B. Igenbergs, inventors (to NASA) (NAS-NRC) Filed 27 Aug. 1974 12 p  
 (NASA-Case-MFS-22145-2; US-Patent-Appl-SN-500982) Avail: NTIS HC \$4.00 CSCL 20I

A self-energized plasma compressor which compresses plasma discharged from a coaxial plasma generator is described. The device includes a helically shaped coil which is coaxially aligned with the center axis of the generator. The plasma generator creates a current through the helical coil, which, in turn,

generates a time varying magnetic field that produces a force which acts radially upon the plasma. The coaxial plasma generator and helical coil move the plasma under high pressure and temperature to the narrow end of the coil. Beads are positioned adjacent to the narrow end of the coil, and are accelerated to hypervelocities by the plasma, thereby simulating meteoroids.

NASA





## 26 PHYSICS, SOLID-STATE

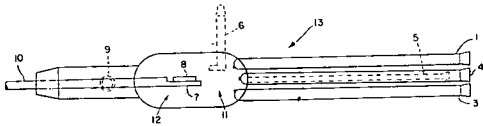
Includes semiconductor theory; and superconductivity. For applications see: 16 Masers. For related information see also: 10 Electronics.

**N74-27261\*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

### VAPOR PHASE GROWTH OF GROUPS III-V COMPOUNDS BY HYDROGEN CHLORIDE TRANSPORT OF THE ELEMENTS Patent Application

Ramesh C. Tyagi (NAS-NRC), William J. Debnam, Jr., Maxwell F. McNear, Roger K. Crouch, and Roger A. Breckenridge, inventors (to NASA) Issued 19 Dec. 1973 15 p  
(NASA-Case-LAR-11144-1; US-Patent-Appl-SN-426405) Avail: NTIS HC \$4.00 CSCL 20L

An apparatus for forming binary, ternary, and quaternary compounds derived from elements of Groups III - V was developed. The apparatus employs a fused quartz growth tube coated with carbon to prevent impurities from being diffused into the crystal being grown. The tube is purged and cleaned after crystal growth by passing hydrogen chloride gas through it. By changing the carrier gas flow rates over various elements, the crystal composition can be graded and controlled to almost any desired product. The preparation of gallium arsenide crystals with good single crystal qualities of the epitaxial layer is described. NASA



## 27 PROPELLANTS

Includes fuels; igniters; and oxidizers. For basic research see: 06 Chemistry; and 33 Thermodynamics and Combustion. For related information see also: 28 Propulsion Systems.

**N74-33209\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

### PREPARING OXIDIZER COATED METAL FUEL PARTICLES Patent

John I. Shafer (JPL) and George M. Simmons, inventors (to NASA) (JPL) Issued 20 Aug. 1974 25 p Filed 2 Feb. 1973 Supersedes N73-17802 (11 - 08, p '0953) Sponsored by NASA

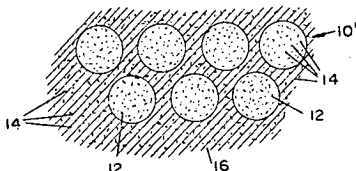
(NASA-Case-NPO-11975-1; US-Patent-3,830,673;

US-Patent-Appl-SN-329243; US-Patent-Class-149-17;

US-Patent-Class-149-60; US-Patent-Class-149-76) Avail: US Patent Office CSCL 211

A solid propellant composition of improved efficiency is described which includes an oxidizer containing ammonium perchlorate, and a powdered metal fuel, preferably aluminum or beryllium, in the form of a composite. The metal fuel is contained in the crystalline lattice framework of the oxidizer, as well as within the oxidizer particles, and is disposed in the interstices between the oxidizer particles of the composition. The propellant composition is produced by a process comprising the crystallization of ammonium perchlorate in water, in the presence of finely divided aluminum or beryllium. A suitable binder is incorporated in the propellant composition to bind the individual particles of metal with the particles of oxidizer containing occluded metal.

Official Gazette of the U.S. Patent Office



## 28 PROPULSION SYSTEMS

Includes air breathing, electric, liquid, solid, and magneto-hydrodynamic propulsion. For nuclear propulsion see: 22 Nuclear Engineering. For basic research see: 23 Physics, General; and 33 Thermodynamics and Combustion. For applications see: 31 Space Vehicles. For related information see also: 27 Propellants.

**N74-28226\*** National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

### **SUPERSONIC FAN BLADING Patent**

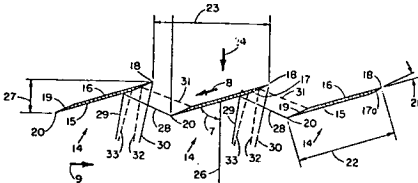
Arthur W. Goldstein, inventor (to NASA) Issued 28 Jun. 1974 4 p Filed 21 Jan. 1972 Supersedes N72-20770 (10 - 11, p 1520)

(NASA-Case-LEW-11402-1; US-Patent-3,820,918;

US-Patent-Appl-SN-219806; US-Patent-Class-416-223;

US-Patent-Class-416-237; US-Patent-Class-415-181) Avail: US Patent Office CSCL 21E

Radially extending rotor blades are disposed on a hub to form a supersonic propulsion fan for a turbofan engine. The peripheral spacing of the blades is such as to avoid forming a channel or passageway between adjacent blades. Each has a flat trailing surface extending from the leading edge at least as far to the rear as to cause any pressure waves which might originate on the blade surface to strike the leading surface of the following blade rather than propagate upstream of the blade row. The flat trailing surface of each blade makes an angle with the axis of rotation such that the blade is parallel to a gas inflow into the blades. Official Gazette of the U.S. Patent Office



**N74-28232\*** National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.

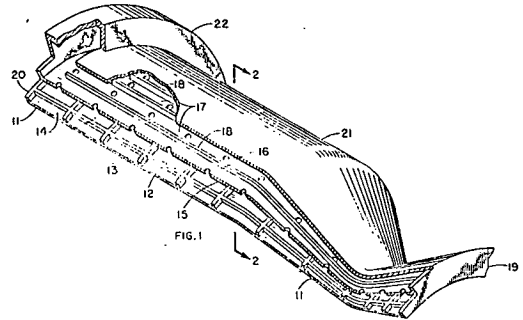
### **ROCKET CHAMBER AND METHOD OF MAKING Patent Application**

Anthony Fortini, inventor (to NASA) Issued 24 Jan. 1974 10 p

(NASA-Case-LEW-11118-2; US-Patent-Appl-SN-436316) Avail: NTIS HC \$4.00 CSCL 21H

A transpiration cooled rocket chamber is made by forming

a porous metal wall on a suitably shaped mandrel. The porous wall may be made of sintered powdered metal, metal fibers sintered on the mandrel or wires woven onto the mandrel and then sintered to bond the interfaces of the wires. Intersecting annular and longitudinal ribs are then electroformed on the porous wall. An interchamber wall having orifices therein is then electroformed over the annular and longitudinal ribs. Parallel longitudinal ribs are then formed on the outside surface of the interchamber wall after which an annular jacket is electroformed over the parallel ribs to form distribution passages therewith. A feed manifold communicating with the distribution passages may be fabricated and welded to the rocket chamber or the feed manifold may be electroformed in place. Author



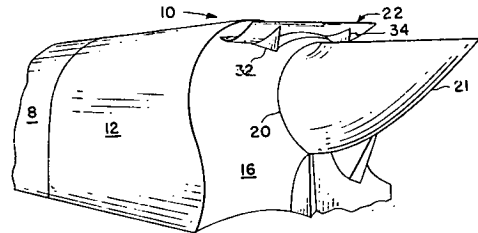
**N74-28233\*#** National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.

### **EXHAUST FLOW DEFLECTOR Patent Application**

John C. Wilson (Army Air Mobility R and D Lab., Hampton, Va.) and Craig S. Shaw, inventors (to NASA) (Army Air Mobility R and D Lab., Hampton, Va.) Issued 25 Jun. 1974 10 p Sponsored by NASA

(NASA-Case-LAR-11570-1; US-Patent-Appl-SN-482967) Avail: NTIS HC \$4.00 CSCL 21E

The development of an exhaust gas deflector for helicopters is discussed. The deflector straightens the swirling exhaust flow to provide better penetration of the freestream. Diagrams are provided to show the operation of the equipment. The device also eliminates heating of the airframe and discoloration of the surface due to the exhaust gases. NASA



## 28 PROPULSION SYSTEMS

**N74-31269\*** National Aeronautics and Space Administration.  
Lewis Research Center, Cleveland, Ohio.  
**SPUTTERING HOLES WITH ION BEAMLETS** Patent

David C. Byers and Bruce A. Banks inventors (to NASA) 30 Jul. 1974 2 p Filed 27 Sep. 1972 Supersedes N72-32760 (10 - 23, p 3132) NASA-Case-LEW-11646-1; US-Patent-3,826,729; US-Patent-Appl-SN-292686; US-Patent-Class-204-192) Avail: US Patent Office CSCL 21C

Ion beamlets of predetermined configurations are formed by shaped apertures in the screen grid of an ion thruster having a double grid accelerator system. A plate is placed downstream from the screen grid holes and attached to the accelerator grid. When the ion thruster is operated holes having the configuration of the beamlets formed by the screen grid are sputtered through the plate at the accelerator grid.

Official Gazette of the U.S. Patent Office

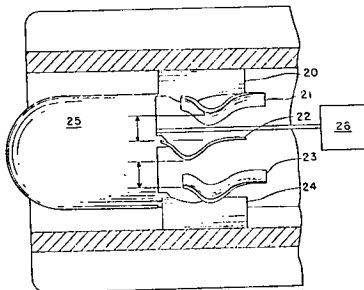
**N74-31270\*** National Aeronautics and Space Administration.  
Langley Research Center, Langley Station, Va.  
**VARIABLY POSITIONED GUIDE VANES FOR AERODYNAMIC CHOKING** Patent

David Chestnutt, inventor (to NASA) Issued 13 Aug. 1974 8 p Filed 27 Jun. 1972 Supersedes N72-27820 (10 - 18, p 2479)

(NASA-Case-LAR-10642-1; US-Patent-3,829,237; US-Patent-Appl-SN-266820; US-Patent-Class-415-181; US-Patent-Class-137-15.1) Avail: US Patent Office CSCL 21E

A choking device to cause a sonic barrier to be formed which reduces the transmission of noise in a direction opposed to the direction of air flow in a compressor that may be part of an aircraft gas turbine engine is described. The noise reduction is accomplished by proper shaping and movement of inlet guide vanes, and an actuator is connected to selected guide vanes to effect movement by programmed amounts as required to choke or partially choke within the design range of the axial-flow-air compressor.

Official Gazette of the U.S. Patent Office



**N74-33218\*** National Aeronautics and Space Administration.  
Ames Research Center, Moffett Field, Calif.

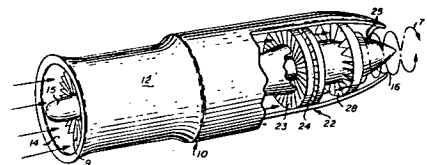
**ABATING EXHAUST NOISES IN JET ENGINES** Patent  
Ira R. Schwartz, inventor (to NASA) Issued 20 Aug. 1974 25 p Filed 23 Mar. 1973 Supersedes N73-20826 (11 - 11,

p 1334)

(NASA-Case-ARC-10712-1; US-Patent-3,830,431; US-Patent-Appl-SN-344410; US-Patent-Class-239-265.11; US-Patent-Class-181-33HC) Avail: US Patent Office CSCL 21E

A noise abating improvement for jet engines including turbojets, turbofans, turboprops, ramjets, scramjets, and hybrid jets is introduced. A provision is made for an apparatus in the primary and/or secondary flow streams of the engines; the apparatus imparts to the exhaust gases a component rotation or swirl about the engine's longitudinal axis. The rotary component in the exhaust gases causes a substantial suppression of sound energy build up normally produced by an axial flow exhaust system.

Official Gazette of the U.S. Patent Office

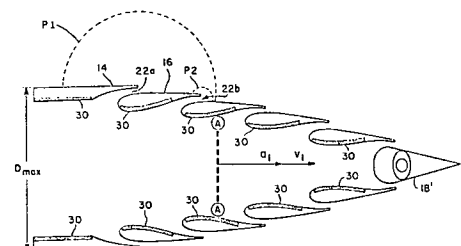


**N74-33220\*#** National Aeronautics and Space Administration.  
Langley Research Center, Langley Station, Va.

**CASCADE PLUG NOZZLE** Patent Application  
Blake W. Corson, Jr., inventor (to NASA) Filed 12 Jul. 1974 23 p  
(NASA-Case-LAR-11674-1; US-Patent-Appl-SN-488616) Avail: NTIS HC \$4.25 CSCL 21E

An exhaust nozzle for jet aircraft is reported which provides suppression of jet noise with a minimum loss of thrust. The segmented nozzle contains a plurality of jet exits which break up the sound waves.

NASA



## 29 SPACE RADIATION

Includes cosmic radiation; solar flares; solar radiation; and Van Allen radiation belts. For related information see also: 13 Geophysics, and 24 Physics, Atomic, Molecular, and Nuclear.

No abstracts in this subject category.

## **30 SPACE SCIENCES**

### **30 SPACE SCIENCES**

Includes astronomy and astrophysics; cosmology; lunar and planetary flight and exploration; and theoretical analysis of orbit and trajectory. For related information see also: 11 Facilities, Research and Support; and 31 Space Vehicles.

**No abstracts in this subject category.**

## 31 SPACE VEHICLES

Includes launch vehicles; manned space capsules; clustered and multistage rockets; satellites; sounding rockets and probes; and operating problems. For basic research see: 30 Space Sciences. For related information see also: 28 Propulsion Systems; and 32 Structural Mechanics.

**N74-27360\*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

### ROCKET HAVING BARIUM RELEASE SYSTEM TO CREATE ION CLOUDS IN THE UPPER ATMOSPHERE Patent

Beverly W. Lewis, Charles S. Stokes (Temple Univ. Res. Inst.), Edward W. Smith (Temple Univ. Res. Inst.), and William J. Murphy, inventors (to NASA) (Temple Univ. Res. Inst.) Issued 4 Jun. 1974 5 p Filed 28 Apr. 1972 Continuation-in-part of US Patent Appl. SN-59892, filed 31 Jul. 1970 Sponsored by NASA

(NASA-Case-LAR-10670-2; US-Patent-3,813,875;

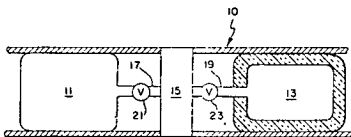
US-Patent-Appl-SN-248761; US-Patent-Class-60-39.46;

US-Patent-Class-60-214; US-Patent-Class-60-215;

US-Patent-Class-102-90; US-Patent-Appl-SN-59892) Avail: US Patent Office CSCL 16E

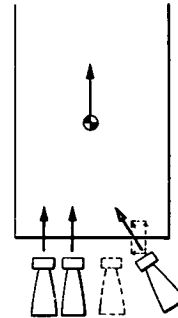
A chemical system for releasing a good yield of free barium atoms and barium ions to create ion clouds in the upper atmosphere and interplanetary space for the study of the geophysical properties of the medium is presented.

Official Gazette of the U.S. Patent Office



rocket engine, hydraulic actuator connected to the platform for imparting selected pivotal motion, an accelerometer and a signal comparator circuit for providing error intelligence indicative of aberration in vehicle acceleration, and an actuator control circuit connected with the actuator and responsive to error intelligence for imparting pivotal motion to the platform. A relocation of the engine's thrust vector is achieved for imparting directional stability to the vehicle.

NASA



**N74-33303\*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

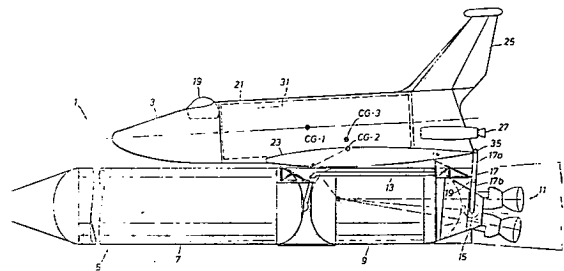
### SPACE VEHICLE SYSTEM Patent Application

Maxine A. Faget, William W. Petynia, and Willard M. Taub, inventors (to NASA) Filed 5 Mar. 1974 23 p

(NASA-Case-MSC-12561-1; US-Patent-Appl-SN-448323) Avail: NTIS HC \$4.25

A space vehicle system consisting of an orbiter vehicle with an expendable propellant tank attached to its underside surface is reported. An engine module is retractably supported from the aft end of the orbiter vehicle and extends beneath it so as to be in axial alignment with the propellant tank when in operation. After the engine has consumed the propellant, it is retracted into the orbiter vehicle and the tank is jettisoned thus reducing orbiter weight and improving flight characteristics.

NASA



**N74-30311\*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### AN IMPROVED SYSTEM FOR IMPOSING DIRECTIONAL STABILITY ON A ROCKET-PROPELLED VEHICLE Patent Application

Harold Perkins, inventor (to NASA) Issued 31 Jul. 1974 15 p

(NASA-Case-MFS-21311-1; US-Patent-Appl-SN-493359) Avail: NTIS HC \$4.00 CSCL 22B

An improved system for use in imposing directional stability on a rocket-propelled vehicle is discussed. The system includes a pivotally supported engine-mounting platform, a gimbal ring mounted on the platform and adapted to pivotally support a

## 32 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; thermal stress; impact phenomena; vibration; flutter; inflatable structures; and structural tests. For related information see also: 17 Materials, Metallic; and 18 Materials, Nonmetallic.

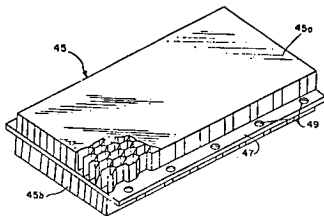
**N74-23449\*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

### TECHNIQUE FOR BONDING Patent Application

Marvin B. Dow, Howard G. Bush, William M. Haraway, Jr., and John F. Crumpler, inventors (to NASA) Filed 24 Jan. 1974 14 p

(NASA-Case-LAR-10073-1; US-Patent-Appl-SN-436317) Avail: NTIS HC \$4.00 CSCL 11D

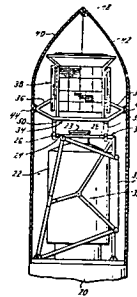
A method for molding a silicone elastomer into a fiberglass honeycomb panel previously bonded to a face sheet panel, is presented. The elastomer is introduced into a mold under vacuum to prevent air entrapment, and the bonded honeycomb panel is positioned above the elastomer filled mold and forced into the elastomer for vacuum filling the honeycomb structure. NASA



US-Patent-3,814,350; US-Patent-Appl-SN-343607; US-Patent-Class-244-1SS; US-Patent-Class-248-16; US-Patent-Class-248-23) Avail: US Patent Office CSCL 20K

A supporting frame for a load, such as one or more telescopes, is isolated from all multi-gravitational forces, which will be developed within that load as that load is propelled into space, by using a shroud to fully and solidly hold that load until that load has been propelled into space. Thereafter, that shroud will be jettisoned; and then supports which are on, and which are movable with, that load will have surfaces thereon moved into supporting engagement with complementary surfaces on that supporting frame to enable that supporting frame and those supports to fully and solidly hold that load.

Official Gazette of the U.S. Patent Office



**N74-27397\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

### THRUST-ISOLATING MOUNTING Patent

Dallas G. Wetzler, inventor (to NASA) (McDonnell-Douglas Corp., Huntington Beach, Calif.) Issued 4 Jun. 1974 11 p Filed 21 Mar. 1973 Sponsored by NASA

(NASA-Case-MFS-21680-1; NASA-Case-MFS-21681-1;



## 33 THERMODYNAMICS AND COMBUSTION

Includes ablation, cooling, heating, heat transfer, thermal balance, and other thermal effects; and combustion theory. For related information see also: 12 Fluid Mechanics; and 27 Propellants.

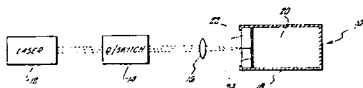
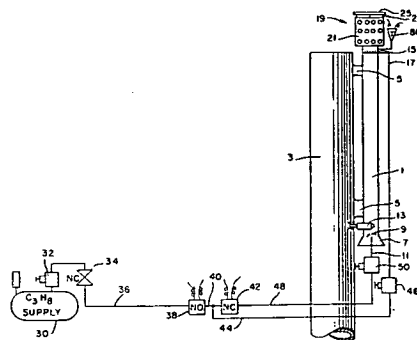
**N74-27426\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**OPTICALLY DETONATED EXPLOSIVE DEVICE Patent**  
Lien C. Yang (JPL) and Vincent J. Menichelli, inventors (to NASA) (JPL) Issued 28 May 1974 5 p Filed 3 Aug. 1972 Sponsored by NASA

(NASA-Case-NPO-11743-1; US-Patent-3,812,783;  
US-Patent-Appl-SN-277904; US-Patent-Class-102-70-2R;  
US-Patent-Class-102-28EB; US-Patent-Class-102-70.2A) Avail:  
US Patent Office CSCL 19A

A technique and apparatus for optically detonating insensitive high explosives, is disclosed. An explosive device is formed by containing high explosive material in a house having a transparent window. A thin metallic film is provided on the interior surface of the window and maintained in contact with the high explosive. A laser pulse provided by a Q-switched laser is focussed on the window to vaporize the metallic film and thereby create a shock wave which detonates the high explosive. Explosive devices may be concurrently or sequentially detonated by employing a fiber optic bundle to transmit the laser pulse to each of the several individual explosive devices.

Official Gazette of the U.S. Patent Office



**N74-33378\*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

**REMOTE FIRE STACK IGNITER Patent**  
William L. Ray, inventor (to NASA) Issued 3 Sep. 1974 6 p  
Filed 29 Aug. 1973 Supersedes N73-31826 (11 -22, p 2727)  
(NASA-Case-MFS-21675-1; US-Patent-3,833,336;  
US-Patent-Appl-SN-392823; US-Patent-Class-431-202;  
US-Patent-Class-23-277C) Avail: US Patent Office CSCL 20M

An igniter is described mounted on a vent stack with an upper, flame cage near the top of the stack to ignite emissions from the stack. The igniter is a tube with a lower, open, flared end having a spark plug near the lower end and a solenoid-controlled valve which supplies propane fuel from a supply tank. Propane from the tank is supplied at the top under control of a second, solenoid-controlled valve. The valve controlling the lower supply is closed after ignition at the flame cage. The igniter is economical, practical, and highly reliable.

Official Gazette of the U.S. Patent Office

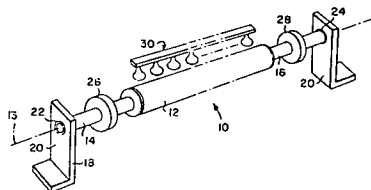
**N74-33379\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**SOLID MEDIUM THERMAL ENGINE Patent**  
James R. Jedlicka, LeRoy R. Guist, and Richard M. Beam, inventors (to NASA) Issued 20 Aug. 1974 25 p Filed 27 Feb. 1973  
Supersedes N73-20931 (11 - 11, p 1347)

(NASA-Case-ARC-10461-1; US-Patent-3,830,060;  
US-Patent-Appl-SN-336319; US-Patent-Class-60-527) Avail:  
US Patent Office CSCL 20M

A device is described which uses a single phase metallic working substance to convert thermal energy directly into mechanical energy. The device consists of a cylindrical metal tube which is free to rotate about its axis while being subjected to continuous bending moment stresses along the longitudinal axis of rotation. The stressing causes portions of the tube to be under compression while other parts are under tension which in turn causes the tube to rotate and provide mechanical energy.

P.N.F.



## **34 GENERAL**

### **34 GENERAL**

Includes information of a broad nature related to industrial applications and technology, and to basic research; defense aspects; information retrieval; management; law and related legal matters; and legislative hearings and documents.

No abstracts in this subject category.

1. Report No. NASA SP-7039 (06)		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle NASA PATENT ABSTRACTS BIBLIOGRAPHY A Continuing Bibliography				5. Report Date January 1975	
				6. Performing Organization Code	
7. Author(s)				8. Performing Organization Report No.	
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, DC 20546				10. Work Unit No.	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address				13. Type of Report and Period Covered	
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15. Supplementary Notes  Section 1 - Abstracts					
16. Abstract  This bibliography is issued in two sections: Section 1 - Abstracts, and Section 2 - Indexes. This issue of the Abstract Section cites 193 patents and applications for patent introduced into the NASA scientific and technical information system during the period of July 1974 through December 1974. Each entry in the Abstract Section consists of a citation, an abstract, and, in most cases, a key illustration selected from the patent or application for patent. This issue of the Index Section contains entries for 2757 patent and application for patent citations covering the period May 1969 through December 1974. The Index Section contains five indexes -- subject, inventor, source, number and accession number.					
17. Key Words (Suggested by Author(s)) Bibliographies Inventions NASA Programs Patents				18. Distribution Statement  Unclassified - Unlimited	
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 90	
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